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COMPUTERWORLD

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All eyes are on Compaq as clone leader increasingly becomes target of low-cost competition. Page 6.

Mini elite struggle to ride Unix wave

BY SALLY CUSACK
CW STAFF

Ten years ago, Wang Laboratories, Inc. led the world in office automation and was growing at a rate of 45% per year. Down the road, Prime Computer, Inc. and Data General Corp. were both checking in with 35% yearly growth, and Honeywell, Inc. was holding its own with a strong minicomputer base.

Now, each of these companies is fighting for survival in today's market; to stay alive, all must move from selling proprietary software-based technologies to an open systems platform.

"They're finding it a tough row to hoe," said Wayne Kernochan, a senior analyst at The Yankee Group, a Boston-based research company. "It's not always clear to their installed base just how to get to Unix from these proprietary platforms, and the companies themselves must learn how to deal with lower-margin markets, as opposed to the high-margin numbers generated from past mainframe and minicomputer sales."

Lessening expectations

Generally speaking, minicomputer sales generate a 50% to 60% gross margin, compared with the estimated 40% gross margin generated by typical workstation sales, according to Kernochan.

In some cases, customers cannot sit and wait for vendors to catch up with open systems technology. Jim Knowles, senior operating officer in charge of application development at Salomon Brothers, Inc. in Rutherford, N.J., has been a Prime minicomputer user for eight years. Now that the company is moving to a distributed Unix environment, Knowles said he feels that Prime does not currently have a box that competes with Digital Equipment Corp. and Sun Microsystems, Inc. in the 490-class machine market.

Knowles added that while he will continue to evaluate any box that meets his price and performance standards, he does not want to be locked into the kind of proprietary software environment that characterized early minicomputers. Salomon

Continued on page 101

Eclipsed stars

Formerly fast chargers in the minicomputer market, Wang, Data General and Prime have seen their proprietary edges dulled

Midrange computers

	1988	1989
DG	1.7%	1.6%
Wang	2.1%	1.9%
Prime	1.4%	1.3%
Total market:	$46.67B	$47.61B

(Percentage of worldwide market by revenue)

CW Chart: Marie Haines
Source: International Data Corp.

Users bolster AIX case

BY JOHANNA AMBROSIO
CW STAFF

WHITE PLAINS, N.Y. — As more information systems departments adopt Unix for software development, IBM appears to be rethinking its long-held position that Unix, CASE and business software do not mix.

Until recently, IBM's message had been that AD/Cycle is for development in IS shops, and its AIX brand of Unix is for technical work. In fact, when IBM announced its RISC System/6000 workstations in February, its accompanying computer-aided software engineering tools were clearly positioned for use in scientific, engineering and other technical applications.

Now, however, IBM is broadening its message. "There is nothing inherent in the architectures of either AD/Cycle or AIX that will

Continued on page 8

Software vendors rip Apple

BY RICHARD PASTORE
CW STAFF

BOSTON — Simmering disputes between Apple Computer, Inc. and other software developers spilled over into the public forum of Macworld Expo last week when software company executives upbraided Apple for its pricing, product line, positioning and management upheavals.

While independent software developers have long chafed under the control that Apple exerts over the third-party Macintosh market — compared with the relatively wide-open personal computer-compatible market — last week's rebellion included Apple's own applications software chief.

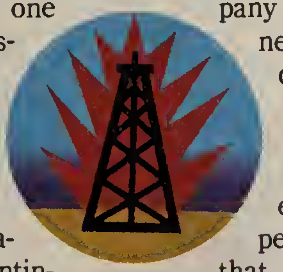
In a panel forum with executives from firms such as Microsoft Corp., Aldus Corp., Symantec Corp. and T/Maker Graphics, William Campbell, president of Apple subsidiary Claris Corp., breached Apple's party line, which holds that the Macintosh is unaffected by the recent challenge of Windows 3.0, Microsoft's graphical user interface for DOS.

"I really believe Apple is out of whack in the price/value relationship," Campbell said.

Continued on page 4

Tech firms dig in behind Saudi border

BY MAURA J. HARRINGTON
and GARY H. ANTHES
CW STAFF



Iraq's Aug. 2 invasion of Kuwait effectively shut down one of the computer industry's most lucrative markets along the Persian Gulf and caused many companies to move abruptly to neighboring Saudi Arabia, where business continues, but at a cautious pace.

"Business is finished in Kuwait," said Hooshang Kaen, president of Intergulf Services, Inc., a Fairfield, N.J.-based company that represents Gulfnet Kuwait, a computer distribution company formerly based in Kuwait. "The Iraqis are literally looting everything . . . there are people and companies that really got hurt. The companies hurt the most were those that had outstanding letters of credit."

Meanwhile, businesses and recruiters in Saudi Arabia said their plans have not changed.

"Naturally, I'm not sending anyone to Kuwait right now, but we have three more people going to Saudi Arabia," said John Leslie, president of The Leslie Corp., a Houston-based employee placement firm that works with U.S. companies placing computer professionals in Middle East operations.

"We've got two families flying into Saudi Arabia this weekend," said Larry Leens, vice-president of operations at Holmes & Narver Services, Inc., an Orange, Calif.-based firm that operates a major utility in Yanbu, Saudi Arabia.

"We are business-as-usual," Leens said, mostly because the power plant is located in Saudi Arabia's Western province, far from the Kuwait border. "We've had some [recruitment candidates] fall out because of concerns about going over there, but probably less than 5%."

Continued on page 99

DASD loyalists

COMPUTERWORLD BUYERS' SCORECARD

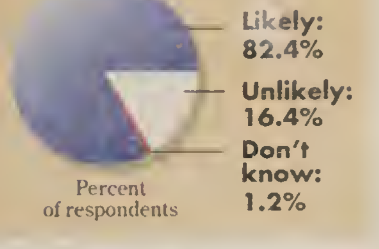
Most users of IBM's 3380-K and compatible disk drives would buy the same product again

See page 68 for Buyers' Scorecard ratings

Would you buy the product again?

IBM 3380/compatible

Response base: 250



CW Chart. Paul Mock

NEWSPAPER
SECOND CLASS

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Quotable

"I really believe Apple's out of whack in the price/value relationship."

WILLIAM CAMPBELL

President of Apple's software subsidiary, Claris Corp., at last week's Macworld Expo. See story page 1.

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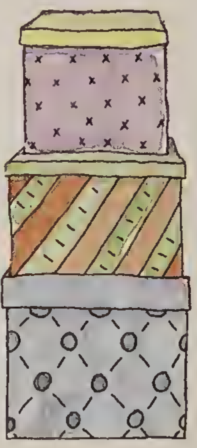
As Yogi Berra once said about baseball, the game is 50% mental, 50% physical and 50% luck. So from the You-Can-Make-Statistics-Prove-Any-Point-You-Want Department comes this vignette by William J. Edwards, an Arthur D. Little vice-president, in a recent Tokyo speech criticizing fears of Japanese investment in the U.S.: "The U.S. is not becoming a colony of any foreign nation . . . foreign direct investment/control has actually decreased from almost 100% in the 1700s to less than 10% today."



Stack, hang, fold, store. Where do you put all the data? Page 61.

David Joel

A complete business transformation enabled by IS is the goal of Continental Bank CIO John Gigerich. Page 51.

EXECUTIVE BRIEFING

■ **Computer business in Kuwait** dropped to virtually zero after the Iraqi invasion. Computer vendors there, selling almost exclusively through third-party distributors, were forced to cut their losses and move on. Business continued pretty much as usual in Saudi Arabia, as most major computer operations are located far from the Kuwaiti border. However, employees at Saudi-based U.S. firms are ready to leave if necessary. Ross Perot, who led the legendary rescue of EDS employees from Iran in 1979, said he would never do business in the Middle East again. Meanwhile, business is booming at St. Paul, Minn.-based Computer Petroleum, which tracks the current price of oil on an electronic database. **Stories, pages 1, 99.**

■ **Is electronic mail private correspondence or corporate property?** That is the issue in a class-action suit filed last week against Epson America, Inc. The suit stems from the January firing of an Epson employee, allegedly because she protested management's reading E-mail messages. But some argue that the requirements of corporate network management and troubleshooting cannot guarantee privacy. **Page 7.**

■ **The three minicomputer stalwarts** — Wang, Prime and Data General — are all attempting the difficult transition from proprietary architectures to open systems. While some users are growing impatient, most remain loyal, giving the companies a good chance to survive if they can adjust to slower sales growth. Meanwhile, IBM appears to be embracing Unix as a CASE environment much more than it did at first. **Stories, page 1.**

■ **Continental Bank is in the midst of a massive business transformation,** and its IS department is playing a major role with database and distributed processing technology. The former Continental Illinois, one of the nation's worst banking disasters, is evolving toward much more flexible product and service offerings. **Page 51.**

■ **AS/400 users who have non-SNA networks** or multivendor environments should be pleased this week when IBM announces additional connectivity capabilities for the midrange platform. A slew of announcements is expected to include better connections to Ethernet, ISDN, TCP/IP, the RS/6000, PCs and facsimile machines. **Page 101.**

■ **Capacity requirements are soaring in data centers,** and people are getting creative about where they store all the data. Aiding them in their venture beyond DASD are new options for faster and "fast-enough" access — namely, expanded memory, solid-state disks, array technology, automated tape libraries and optical/magnetic, optical/tape combinations. **Page 61.**

■ **Downsizing and belt-tightening** have knocked some rungs out of the corporate ladder at many companies. As a result, ambitious IS professionals need to find new ways to get ahead. One route they can take is to create their own promotion by writing a new job description. But they'd better go about it the right way. **Page 83.**

■ **On-site this week:** Who runs the biggest day-care system in America? The U.S. Army. And it runs more efficiently because of Filepro, a Unix-based database management system/application development tool running on PCs at Ft. Benning, Ga. **Page 39.** Flexible CAD software helps Synthes in Paoli, Pa., design more flexible surgical implants. The firm uses Computervision's Medusa software, and a global link on a DEC network enables sharing of design data among Synthes plants and laboratories in Pennsylvania, Colorado and Switzerland. **Page 29.**

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System 7 demo soothes user fears

BY RICHARD PASTORE
CW STAFF

BOSTON — Skittish Macintosh users and developers got their first public look at the System 7 operating system last week and apparently liked what they saw.

Many who were interviewed said they were nervous about compatibility issues but are relieved by Apple Computer, Inc.'s promise that all existing Macintosh applications will run under System 7.

"After the introduction of System 6, our fingers were seriously burned" because of incompatibility problems, said Chris Espinosa, Apple's systems software product manager. "This time, developers had eight to nine months to test compatibility, rather than the four or five weeks they had with System 6."

As expected, Apple has included virtual-memory capability in the release. If the system memory overloads, the operating system can use hard disk space for memory. However, this process will slow the system down, Espinosa noted.

The feature that captured the most attention was a new file-sharing ability. With it, Macintosh users connected over Apple Localtalk links can share designated file folders with other individual users or groups of users. The feature also allows Macintosh users to access their hard disks from remote locations simply by logging on to another Macintosh and typing in the appropriate passwords.

> "THIS TIME, developers had eight to nine months to test [System 7] compatibility, rather than the four or five weeks they had with System 6."
>
> CHRIS ESPINOSA
> APPLE COMPUTER

With the file-sharing capability, managers can install System 7 remotely on any number of Macintoshes.

Despite its apparent convenience, file sharing raised security concerns. "The government and military will be resistant to some of the features in System 7. They won't be able to take advantage of [file sharing] right off," said Stephen Broughall, president of the Pentagon Macintosh Users Group.

Most users, however, expressed excitement about file sharing. "Having the Macintosh connected to a network makes more sense with System 7," said Max Minkoff, workstation and local-area network support specialist at chemical maker Rohm & Haas Co. in Philadelphia. Users will be able to share disks and files without the need for intervention by a network server administrator, making interoffice cooperation a lot easier, he said.

Minkoff, whose company has 1,000 to 1,500 Macintoshes, also praised the remote installation feature: "It'll be fantastic for installing applications."

A few members of the audience were put off when Espinosa told them that the Multifinder feature will no longer be an option but will be constantly turned on under System 7.

"I'm going to stay with System 6 because I have users who are confused with Multifinder now," one micro manager said. "You're adding a layer of complexity to a computer that was supposed to be easy to use."

Smoothed out

As expected, the upgrade includes Apple's new Truetype outline font technology, which renders alphanumeric figures without the jagged edges of bit-mapped fonts. However, much to the relief of users with heavy investments in Adobe Systems, Inc.'s Postscript fonts, System 7 will support all Macintosh-compatible bit-mapped fonts as well.

System 7 will cost about $50 when it becomes available. Beta-test versions will soon be sent to national user sites.

The requirements to run System 7 will be a Macintosh Plus or higher with at least 2M bytes of memory and a hard disk drive. A Motorola, Inc. 68030 microprocessor is needed to use the virtual memory feature.

Apple

FROM PAGE 1

"There is no longer such a differentiation [with DOS-based PCs] that it takes a no-brain decision to spend many more thousands of dollars for a Mac." A hail of applause from the packed house of Expo-goers endorsed Campbell's opinion.

Apple recently announced that it had decided to retain Claris as a subsidiary rather than spinning it off as an independent company as Apple had long promised.

Many Macintosh software developers have taken umbrage at Apple's reversal on retaining ownership of Claris. T/Maker Graphics President Heidi Roizen summed up third-party developers' fears of unfair competition: "In the short term, I worry about what Claris can do with inside knowledge from Apple."

Opening another crack in Apple's public facade, Campbell complained that the Macintosh is mired in a desktop publishing niche — the applications segment that many credit for Apple's ability to break into the MS-DOS-oriented corporate market. "That image should be put aside," Campbell said. "The Mac must be marketed as a machine for all facets of users."

Apple's product line must be broadened to become competitive, said Symantec President Gordon Eubanks Jr. "You need to introduce laptops that someone other than Bo Jackson can carry around," he said.

In a swipe at Apple's penchant for protecting its proprietary edge by suing alleged copyright infringers — such as Microsoft for its Windows 3.0 and Hewlett-Packard Co. for its New Wave product — Eubanks offered Apple Chairman John Sculley this recipe for renewed success in the product arena: "A pound of innovation for every ounce of litigation."

Stipulating terms

Macintosh software developers are demanding a series of Apple concessions

- Cut prices on existing line
- Introduce lower-cost Macintoshes
- Broaden the product line
- Help developers work with customers
- Stabilize management
- Sell the Mac as a business box, not as a desktop publishing machine
- Spin off Claris
- Second-source Mac technology
- Increase connectivity with DOS world

CW Chart: Paul Mock

Another notion proffered by the Symantec chief was that Apple contract with outside developers to provide a second source for Macintosh technology.

The idea of second sourcing or licensing the Macintosh's read-only memory has also been proposed recently by other industry analysts. The argument is that third-party machines running Macintosh software would increase the installed base and attract more software development.

Aldus President Paul Brainerd chided Apple for its recent executive suite upheavals.

"The internal turmoil has made it more and more difficult to work with them," Brainerd said."

Benny Lorenzo, an investment analyst at Volpe, Welty & Co. in San Francisco, was not surprised at the public airing of grievances. "These folks are getting much more vocal and public about sentiments that were expressed in private," he said.

However, Lorenzo added, "It is pretty clear that Apple is addressing them, maybe not as quickly as the various audiences would like."

Microsoft's Mike Maples, vice-president of the applications software division, seemed reluctant to take his turn after listening to the other panelists refer to the threat posed by Microsoft's DOS-based Windows 3.0.

"You'd think I represent the evil empire here," he said.

Maples called on Apple to increase its efforts in cross-platform communication and coexistence with the DOS world — both from a technical and a marketing standpoint.

Sculley, who took the stage shortly after the panel discussion, stuck to his keynote script and made no reference to the panel. He walked through nine new third-party application demos and concluded by saying: "The Mac is alive and well."

Correction

A chart on European mainframe shipments [CW, Aug. 6] mislabeled 1988 figures as 1989 and 1989 figures as 1990. Additionally, the source of the information has revised its shipment figures. The corrected chart appears below.

Value of European mainframe shipments
(in millions)

	1988	1989
Total European market	**$8,440**	**$9,069**
IBM	$4,400	$5,514
ICL	$196	$209
Fujitsu	$36	$75
Amdahl	$493	$649
Siemens*	$550	$471
Hitachi Data Systems	$274	$279
Comparex**	$516	$505

* Fujitsu reseller ** Hitachi reseller

Source: International Data Corp. CW Chart: Paul Mock

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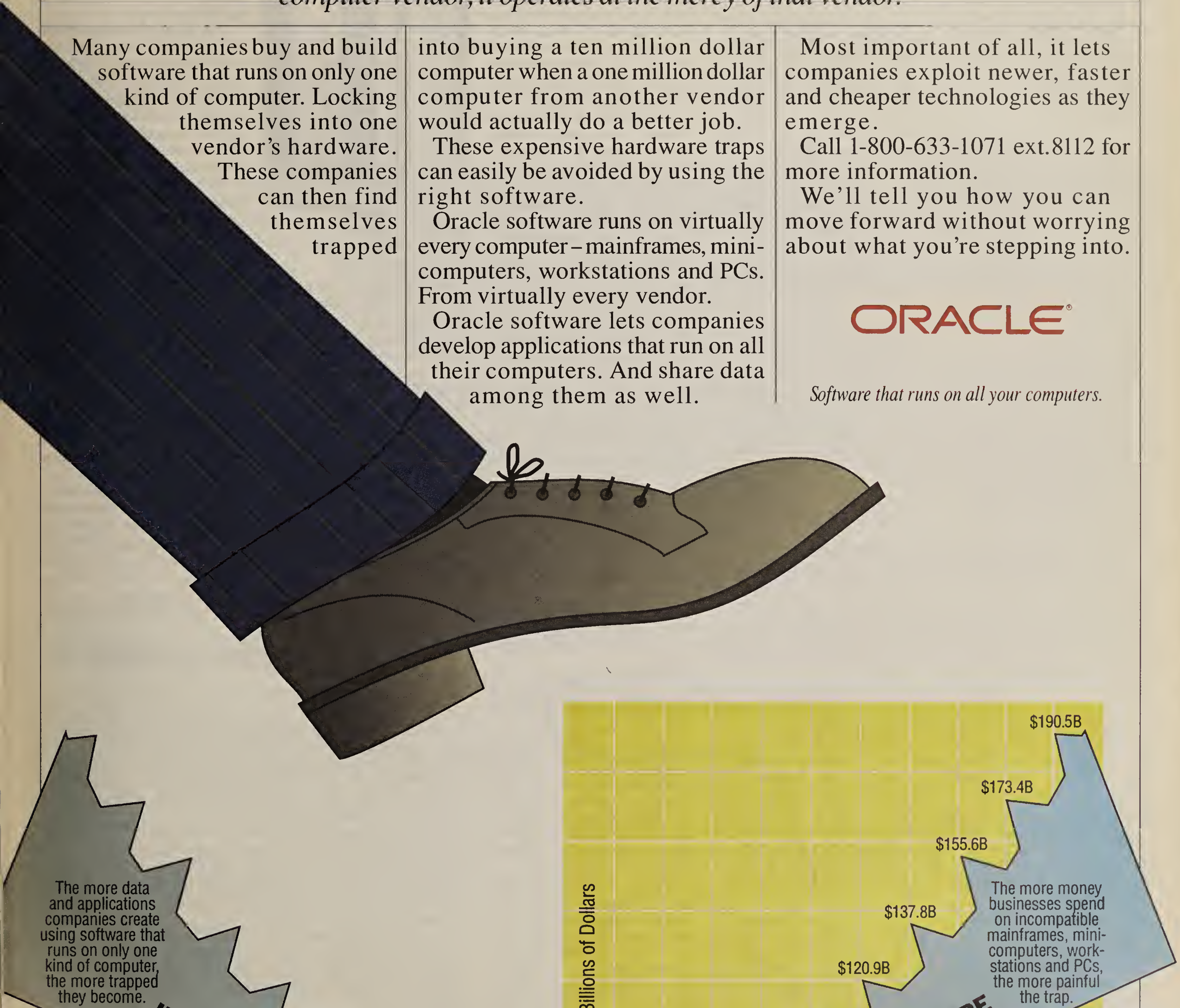

The more data and applications companies create using software that runs on only one kind of computer, the more trapped they become.

The more money businesses spend on incompatible mainframes, minicomputers, workstations and PCs, the more painful the trap.

Annual domestic expenditures for computer hardware.
Gartner Group 1990

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NEWS SHORTS

No winner seen in Intel chip spat

Both Advanced Micro Devices, Inc. and Intel Corp. claimed that a court decision last week was on their side. Court documents, however, granted Intel's preliminary injunction against Advanced Micro's claim that its 80287 math co-processor is a "genuine Intel equivalent" or "100% Intel-compatible." The San Jose, Calif., District Court allowed Advanced Micro to keep its 80287 name, however. The decision was in advance of a February 1991 trial to decide whether Advanced Micro could use Intel's microcode in products. Intel claimed an agreement between the firms allows microcode to be used within Advanced Micro.

……

AS/400 users get software shell

IBM quietly unveiled a new software tool last week that could prove a boon to its Application System/400 users running software from multiple sources. The Application Program Driver, which sits like a shell over the OS/400 operating system, is a cross-application utility tool that IBM claimed will enhance security controls, automate system backup and job scheduling more efficiently and let programmers create simplified menu screens so users can navigate more smoothly between applications with the same "look and feel."

……

OSF upgrades Motif interface

The Open Software Foundation (OSF) is due to introduce Version 1.1 of its Motif user interface today. Some 40 new features have been added, according to OSF's Craig Lamont, business area manager. These include "significant" performance enhancements, cached gadgets, improved color coordination and the ability to scroll through text faster. In other OSF news, the group said it is still on schedule to ship its Unix OSF/1 operating system in November.

……

AT&T cuts back its systems division

AT&T's Computer Systems division is reorganizing and will lay off up to 500 people unless they can be reassigned, a spokesman said. The group is consolidating all of its units, including sales, service and technical support. Also, where product development, product management and product marketing were previously in separate organizations, cross-discipline teams will now be deployed for specific products.

……

Poland, U.S. sign import pact

Poland has signed an agreement with the U.S. that will free it to import high-technology goods denied it under Communist rule. The agreement is aimed at guaranteeing Polish importers access to the most modern U.S. goods and technology, according to a Polish customs spokesman. He added that Poland pledged not to re-export these goods to third countries without U.S. agreement. The accord with Poland follows a June decision by the Coordinating Committee for Multilateral Export Controls to ease limits on exports to Poland, Czechoslovakia and Hungary.

……

OSF member opts for AT&T Unix

Unix International scored a public relations victory last week when Siemens AG, a founding member of the Open Software Foundation, announced two weeks ago in Europe that when its MX 300 multiuser workstation ships in October, the underlying operating system will be Unix System V Release 4.0 from OSF rival AT&T. Siemens still plans to provide a Motif interface on top of Unix System V, spokesman Jan Buchmann said. The reason for the switch is that the OSF/1 operating system will not ship until November and Siemens wants to sell its machines now. "They are the first significant member to bow to customer pressure on availability," said Chuck Barney, an analyst at Workgroup Technologies, Inc. "Basically, they just couldn't wait for OSF/1." Unix International President and Chief Executive Officer Peter Cunningham added: "We applaud their decision."

More news shorts on page 100

Contenders challenge Compaq

Opponents hope to chip away at Compaq's success with low-priced clones

BY RICHARD PASTORE
CW STAFF

The competition is increasingly gunning for Compaq Computer Corp. Last week, the Houston firm's flagship Systempro personal computer, LTE notebook PC and network node boxes joined its high-end desktop PCs on the list of recent targets.

"Everybody is going after Compaq," said JoeAnn Stahel, market analyst at Storeboard/Computer Intelligence in Dallas. Observers said that the competition covets Compaq's sustained success and believes the market is ready to accept advanced technology from low-priced cloners.

Compaq co-founder and Chief Executive Officer Rod Canion said the competition, though fierce, does not have him worried. "Unless the competitor has the reputation and channel presence to ship a high volume of product, it really isn't a big deal," he said. "They come in and get a little business for a while, but it doesn't last unless one of them emerges as a leader of some sort."

ALR's servers *plug into Novell Netware sites*

High-end high stakes

Hoping to prove itself a leader in high-end systems, Advanced Logic Research, Inc. fired a salvo last week at Compaq's dual-CPU Systempro. ALR's new Business Server line is designed for large Novell, Inc. networks or multiuser, data-intensive environments.

The servers' hardware configurations run the gamut from Intel Corp. 33-MHz 80386 CPUs with AT-style buses to Intel 33-MHz I486 processors with Extended Industry Standard Architecture or IBM Micro Channel Architecture buses. The systems are all preconfigured for Novell Netware installation, the Irvine, Calif., company said.

The minicomputer-style chassis features eight storage bays, six small computer systems interface hard disk drives and a built-in uninterruptible power supply. Disk storage begins at 330M bytes or 650M bytes and is expandable to 10G bytes of capacity. Prices range from $15,000 to $22,000, compared with the Systempro's range of $14,000 to $30,000.

Tandy Corp. last week took its best shot at Compaq's market-leading LTE notebook-size PC. The new Tandy 1500 HD packs a 3½-hour battery, 20M-byte hard disk and floppy drive into a package weighing a hair less than six pounds. At $1,900, the 1500 HD undercuts the slightly heavier LTE by $700.

With a 10-MHz Intel 8086-comparable processor, 640K bytes of memory expandable to 1.64M bytes and IBM's Color Graphics Adapter graphics, the 1500's features closely shadow the main components of the LTE. For added value, Tandy throws in an AC charger and MS-DOS Version 3.3 — two options that Compaq charges for. However, the Tandy model lacks the LTE's external key pad and video ports, so users cannot plug the 1500 into their desktop monitors.

The Tandy machine will be available at Radio Shack stores in September, the company said.

Mail-order and superstore retailer Compuadd Corp. took aim at Compaq's high-end Deskpro 386/33 last week. Based on Intel's 33-MHz 80386 chip, the Compuadd machines ship with Microsoft Corp.'s Windows 3.0 and DOS preloaded.

The Austin, Texas-based firm said its 333T tower unit and 333FP desktop model will ship in September. With a 150M-byte hard disk, the tower and desktop models will sell for $5,975 and $5,795, respectively. Compaq's 33-MHz 386 box with an 84M-byte hard disk retails for $9,999.

Earlier this month, American Mitac Corp. launched a salvo at Compaq's low-priced 386N and 286N network node workstations. The Intel 80286-based Mistation 2 and 80386SX-based Mistation 3 are both available in diskless versions.

The Mistations offer higher resolution graphics than the Compaq machines, and the 200M-byte hard disk option eclipses Compaq's 40M-byte disk offering. However, the Mitac machines offer memory expansion only up to 8M bytes, whereas Compaq offers expansion up to 16M bytes.

The San Jose, Calif., firm is pricing its diskless Mistation 2 and Mistation 3 at $1,345 and $1,695, respectively. With 1M byte of memory and a floppy drive, the PCs cost $1,445 and $1,795, respectively.

An Ultralite, please

WOOD DALE, Ill. — NEC Technologies, Inc. is expected to take the wraps off its long-rumored Ultralite follow-on today and introduce a high-performance laptop PC as well.

Not quite as ultralight as its 4.4-pound predecessor, the new notebook PC will weigh in at 6.5 pounds. The extra ounces come from the addition of a 20M-byte hard disk and a more robust Intel 12-MHz 80286 chip.

The Ultralite 286V improves on the original's IBM Color Graphics Adapter graphics, offering IBM Video Graphics Array (VGA) with a resolution of 640 by 480 pixels. The $4,000 units include an external 3½-in., 1.44M-byte floppy disk drive, DOS Version 4.01 and 1M byte of system memory that is expandable to 2M or 5M bytes.

Like its predecessor, the new model incorporates a slot for NEC's proprietary random-access memory cards and third-party read-only memory software cards. The dual, rechargeable batteries have a life expectancy of 2½ hours, according to NEC.

Options include a 2,400 bit/sec. modem and a small computer systems interface adapter. The notebook PC will ship next month, according to the company.

NEC also announced shipment of a laptop PC based on Intel's 20-MHz 80386SX chip. The 12.9-pound Prospeed SX/20 features a 40M-byte hard disk, VGA graphics and 1M byte of RAM, expandable to 5M bytes. It ships with DOS Version 4.1 and a three-hour battery and charger.

The Prospeed is NEC's second laptop designed to connect to a docking station — a 14-pound, desk-resident expansion chassis that features two AT-style expansion slots, extra serial and parallel ports and graphic display connectors. The computer costs $6,000, while the docking station is priced at $1,199.

RICHARD PASTORE

E-mail lawsuit cranks open privacy rights can of worms

BY JIM NASH
CW STAFF

Privacy v. *Property* might be a better case name for the invasion-of-privacy suit filed last week against Epson America, Inc.

The suit, born out of a personnel dispute last January at Epson's Torrance, Calif., headquarters, pits those who hold electronic mail to be as inviolate as U.S. mail against those who consider E-mail company property.

Attorney Noel Shipman filed the class-action suit in Los Angeles Superior Court on behalf of Alana Shoars, Dick Flanagan, Lee Cheaney, Glen Mosby — all former Epson employees — and hundreds of other Epson employees who have used the company's E-mail since August 1989. Shipman claimed that it was at about that time that Robert Hillseth, manager of Epson's Hewlett-Packard Co. computer system, illegally tapped messages passing through a gateway between the HP system and its external MCI Communications Corp. E-mail service.

Shipman seeks damages of $3,000 per person for each alleged violation of a California statute barring the interception of an electronic communication without consent of all parties in the communication.

A spokesperson for Epson dismissed the claims, saying Epson's unofficial policy has been to read only those messages snared through routine network administration or troubleshooting. Shoars claimed she was fired Jan. 25 as E-mail administrator at Epson after she protested the alleged capture and printing of "thousands" of password-protected messages by Hillseth, who was her manager.

An internal memorandum distributed to all Epson employees last month stated that "all . . . data transmission equipment and services are intended for authorized business use only." It also stated that Epson's need to maintain network operations, prevent system misuse and curb software piracy means it "cannot guarantee the privacy of documents and messages" stored anywhere in the company.

Users at other firms contacted last week about the issues raised by the suit said they honored password-protected E-mail. "As a network administrator, I have no ability to review mail. I suppose it's possible to break the code, but I'm not going to ask many questions [of the vendor] about how to do it," said Roger Stucke at Pacific Resources, Inc. in Honolulu.

"I can't imagine an instance when I would need to know what's in a message in order to manage the system," Stucke said. He added that some networks without password protection as a standard feature, such as IBM's Professional Office System, might end up revealing a message's contents in troubleshooting.

Stephen Odo, manager of systems programming at the Unversity of Hawaii's Honolulu computing center, said his staff accesses E-mail only when a problem in the network requires it. Odo explained that such an instance would be when a new vendor's network server has been hooked up and needs debugging. "It does bother us," he said. "[Users] trust us not to go poking around for curiosity."

Peter Drewliner, vice-president of Bank of Hawaii in Honolulu, said the bank has no written policy on intercepting E-mail. All messages are either shielded by individual or group passwords. Drewliner said that to his knowledge, no sampling has been conducted.

Sun profits back to high altitude

MOUNTAIN VIEW, Calif. — Sun Microsystems, Inc.'s first annual earnings report since a botched orders brouhaha, which threw the firm $20 million into the red in last year's fourth quarter, proved a decisive victory for the Bible, Ernest Hemingway, a slew of Wall Street analysts and anyone else who has ever said The Sun Also Rises.

The workstation maker logged net income of $111 million on revenue of $2.5 billion for the fiscal year ended June 30 — increases of 83% and 40%, respectively, over net income and revenue reported for fiscal 1989.

Sun's fourth-quarter revenue shot up 62% over sales in last year's comparable quarter; a quarterly profit of $49 million contrasted with last year's fourth-quarter loss.

In a prepared statement, Chief Executive Officer Scott McNealy credited Sun employees across the board with "returning the company to levels of service, quality and profitability we can be proud of." He cited an all-time high in revenue per employee: $215,000, up 24% from the 1989 figure.

McNealy also emphasized Sun's solid year-end balance sheet. The company ended the fourth quarter with a cash balance of $394 million, short-term debt down $104 million and inventory levels down approximately 33% from last year's closing tally.

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CSP push winning customers

BY ROSEMARY HAMILTON
CW STAFF

More and more mainframe shops are using IBM's Cross System Product (CSP), but many of them still do not think much of it.

CSP seems to be catching users' eyes more for its strategic positioning than its usefulness. While the software has long been heavily promoted by IBM, it has received even more of a push recently. In addition to playing a key role in both DB2 and the Systems Application Architecture (SAA) strategy, CSP is now a critical piece of the company's grand plan for application development, AD/Cycle.

"We looked at it in the past, and we were not particularly impressed with it," said Vince Hilly, director of data administration at Depository Trust Co. in New York. But the company has a big commitment to AD/Cycle and installed Repository Manager earlier this year. As a result, "we will re-examine CSP, probably in the not-too-distant future," Hilly said.

The strategic position, combined with slow but steady product enhancements, has given CSP a new lease on life.

Not so long ago, CSP was dismissed as a feeble application development environment that would never be a big success. However, Computer Intelligence polls on mainframe purchase plans now show CSP pulling far ahead of the competition. What's more, worldwide licenses now number 5,000, with one-third of those in the U.S., according to Martha Rivers, a CSP product manager at IBM.

However, numbers do not tell the whole story. Users contacted recently gave the product lukewarm ratings. While they said IBM has made progress from the mid-1980s — when the software was written off as too slow and clumsy — there is still room for improvement. They most often cited DB2, AD/Cycle or other product-related reasons for selecting CSP.

Consultants contacted recently suggested that the mediocre product's success is a classic case of IBM's marketing might — it works when you ride the coattails of DB2 and AD/Cycle.

"IBM's been telling the world it's strategic, so it goes into people's buying plans," according to Vaughan Merlyn, chairman of CASE Research Corp.

While current CSP users are not exactly a thrilled bunch, some contacted recently said they believe IBM will make great strides to improve CSP because it is so strategic.

"In some ways, it is a dog, but for low-volume transaction processing [applications], it makes sense," said Adam Backenroth, a vice-president of Geoserve, the information systems arm of Manufacturers Hanover Trust Co. "I wasn't involved in the selection, and if I had been, I probably wouldn't have selected it. Now, looking to the future with the IBM statements gives us assurance that it will get better."

Richard Dixon, manager of inventory management systems at Book of the Month Club, Inc. in Mechanicsburg, Pa., has similar hopes. He said CSP has been productive, but he stopped short of giving it a big thumbs-up. It was installed around the time DB2 was delivered to the firm.

"I was probably one of the biggest bigots against it," Dixon said. "We were selecting not only an on-line development tool but a database and looking to minimize vendors. We wanted something higher level than command-level CICS, and we knew IBM would always be there."

CSP was first released in the late 1970s as an application development tool for the IBM 8100 series, which has since been discontinued. Initially, IBM converted CSP to the System/370 world for VSE users. This was partly because of CSP's ability to accommodate other operating environments, allowing users working under one operating system to write code for another.

IBM expanded CSP to both MVS and VM in the mid-1980s and focused on its ability to address multiple System/370 operating systems. This concept was highlighted again in 1987 when IBM rolled out its SAA concept, which was intended to create a more seamless environment across the diverse IBM platforms.

CSP, as part of SAA, would allow a programmer in one SAA operating environment to write a program for any of the other SAA ones. The development would be done in a CSP execution mode on one platform and transferred to a CSP runtime mode to a different platform.

More recently, the multi-operating system facility, along with the newer code generation capability, was featured in CSP's positioning with the AD/Cycle rollout. CSP is now the official AD/Cycle code generator. While IBM acknowledged that CSP has suffered from an image problem, it points out that it has been steadily improving the product.

"The enthusiasm is still building," said Dick Johnston, a CSP marketing manager at IBM. "For many of those large customers that have looked at it in the past years and months, they need to look at it again, because it's a different product."

Climb to success

Annual buying plan surveys indicate a strong shift toward IBM's CSP over competing mainframe application development tools

	1985	1987	1989
Computer Associates*	29%	23%	14%
Cincom's Mantis	14%	5%	4%
IBM's CSP	9%	32%	39%
Pansophic's Telon and General	17%	18%	12%
Software AG's Natural	9%	12%	12%
Other	22%	10%	19%

*Represents a variety of products, including those of acquired companies ADR and Cullinet Software

Source: Computer Intelligence CW Chart: Marie Haines

Rival camps

One thing is certain about CSP: It has its share of reluctant users.

At Reynolds Metals Co. in Richmond, Va., CSP has divided users into two camps: those who back it and those who would like to see it go, according to information systems director Jim Matsey.

"We have a mixed bag here, with some saying it's an adequate product and other people who think it isn't good because it has limitations and consumes resources," Matsey said. "But we are still using it and still anticipating that IBM will improve the product. We aren't sure where it's going to go."

Dan Cavanagh, a senior vice-president at Metropolitan Life Insurance Co., said CSP "seemed like a product that we shouldn't just ignore, given IBM's position on it."

So the company installed it, but it is only used in one development area.

Other users are considering it with no urgency. "We looked at it a year ago and didn't think it had enough functionality," said Gavin Taylor, senior vice-president of the information services division at Putnam Cos. in Boston. "But we intend to [look again]. We just formed a team to look at AD/Cycle."

Anchor Systems Corp., the IS services division of Anchor Savings Bank, used CSP, got rid of it and plans to look at it again sometime in the future, according to President Joseph Talka.

"We found it wasn't good for batch," Talka said. "We were writing half [our code] with conventional Cobol. Our general philosophy is to stay close to the Blue line, if you will. It just didn't work out."

However, Anchor is ramping up for a computer-aided software engineering strategy and will likely review CSP again.

Strategic saga

CSP's strategic role with other key products and plans at IBM continues to be fine-tuned.

The original goal was to provide both CSP runtime and execution modes for the four IBM SAA platforms. Now IBM is focusing on the mainframe and microcomputer platforms. It will not provide CSP on the Application System/400.

"Our strategy now is to take [the CSP] functions down to the OS/2 platform and not propagate it across all SAA platforms," said Martha Rivers, an IBM CSP product manager.

The reason, she said, was "because the ability to provide a generator [on the AS/400] was so far down on our plans that we decided it was better to make an arrangement with Synon."

With AD/Cycle, CSP's application development capabilities will still be featured, but the newer code generation function will get more attention in the future.

AIX

FROM PAGE 1

prohibit you from developing any kind of application you want on either platform," said Jack Clemons, IBM's manager of technical CASE solutions. "High-performance [reduced instruction set computing] workstations are becoming very popular, and we're beginning to see IS development work on these platforms."

Clemons said what separates the AD/Cycle and AIX development platforms is "tradition — IS traditionally is mainframe-oriented, and the technical market traditionally is workstation- and Unix-oriented. But as these traditions start to blend, we will evolve the strategy on both sides." IBM's overall strategy, he said, is to "allow customers to move around and do IS or technical work on both types of platforms."

In this scenario, customers could use either OS/2 or Unix on workstations to develop applications that are targeted to run on IBM mainframes. Also, IBM has committed to building bridges between AIX and its Systems Application Architecture (SAA) operating environments so that both use common languages, user interfaces and communications protocols.

IBM seems to be taking its cues from the industry as a whole. Some non-IBM shops are already using Unix as a development platform. The Burlington Coat Factory Warehouse Corp. in Lebanon, N.H., is "in the process of taking our applications and bringing them up in a Unix environment," said Michael Prince, MIS director. The applications currently running on the company's Bull HN Information Systems, Inc. mainframe are being rewritten for Sequent Computer Systems, Inc. computers running Unix.

The Mellon Bank Corp. in Pittsburgh is looking into Unix to build applications, said George DiNardo, executive vice-president of information management and research.

"We're looking into OS/2 and Unix because of their graphical approaches to programming. You can see where other problems are," DiNardo said.

For its part, IBM will "let the customers tell us what they want" in this still-developing market, Clemons said. "There aren't customers yet doing heavy development work in either AD/Cycle or AIX, so the strategy is to get them installed, build the bridges between the two environments and let the market lead us."

For example, he said, it is unclear at this point whether IBM will build a separate repository for AIX or let AIX developers use the one on the host, or some combination of both. Industry observers note that many IS shops will inevitably be using both Unix and proprietary platforms for software development. "IBM mainframes have the hearts and minds of IS directors, but little by little, when they have to program for a complex application like networking and distributed processing, all these things will migrate to Unix," said Brian Boyle, director of research at Novon Research Group in Berkeley, Calif.

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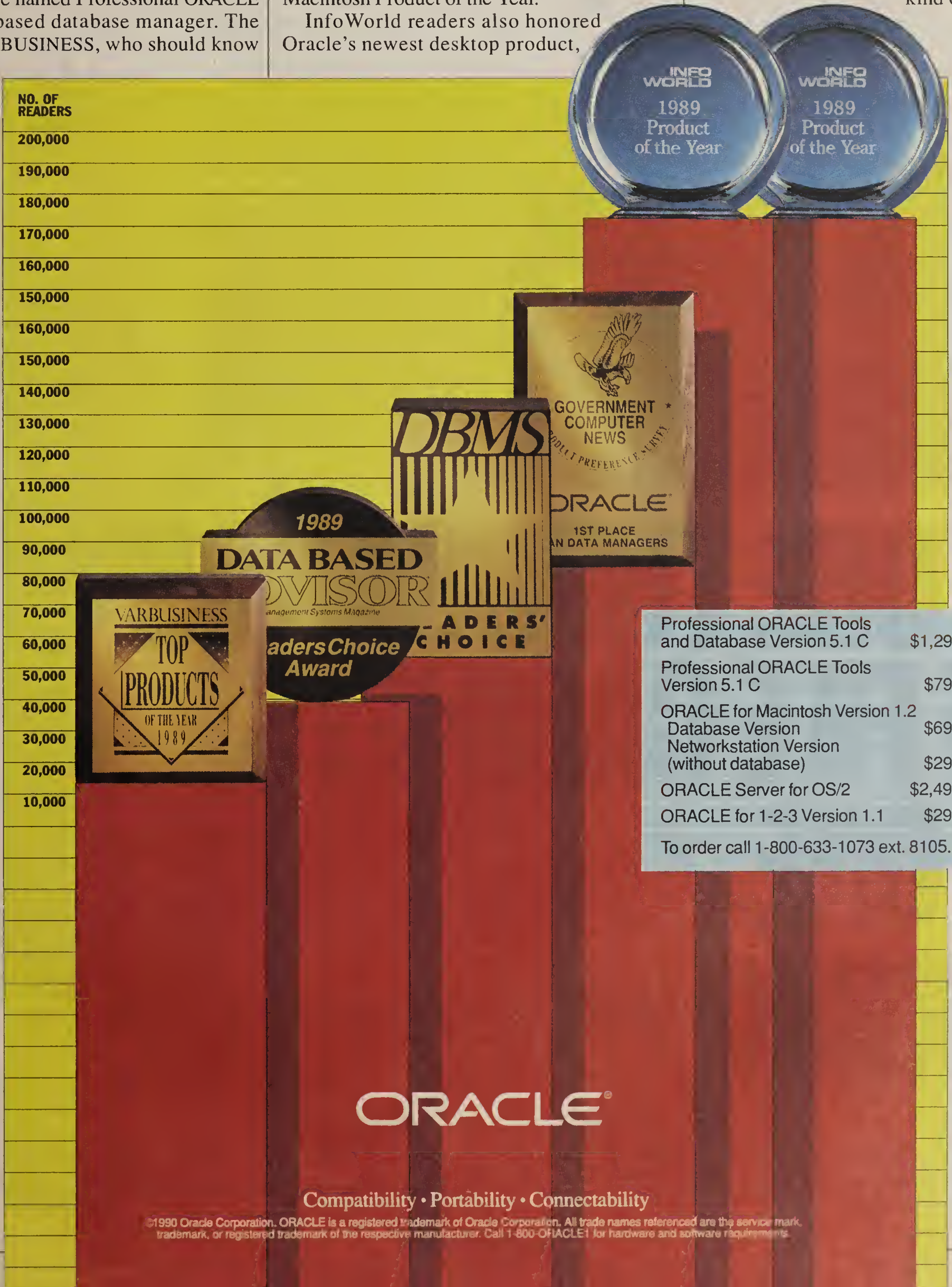

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Lotus preparing to tighten fiscal belt

BY PATRICIA KEEFE
CW STAFF

CAMBRIDGE, Mass. — Lotus Development Corp. appears to be battening down the hatches in preparation for a potentially rocky third — and perhaps fourth — quarter. The spreadsheet maker confirmed last week that it is eliminating 40 positions through job consolidation and has instituted an almost companywide hiring freeze.

Moreover, "there is clearly a process in place where we are trying to identify areas in which we could do more with less," Lotus spokesman Richard Eckel said. For example, Lotus wants to cut its travel and entertainment costs by 50%, he said.

Eckel attributed these cutbacks in part to fallout from a recent reshuffling at the executive level resulting in a number of consolidations among departments [CW, July 16]. However, he admitted that expectations for the third quarter "are clearly an element."

Asked whether this is a one-time layoff, Eckel would only say that "no more cuts are planned at this time." He also claimed that only 20 employees will actually lose their jobs. Lotus currently has a total of 3,100 employees.

One Wall Street analyst suggested that Lotus' current divisions could get along with as much as 25% fewer staff, adding that those employees could probably be deployed into new areas. In fact, Lotus does plan to add between 150 and 200 staff members to the international, consulting and product support areas by year's end.

In an analyst meeting last month, Lotus Vice-President of Finance Robert Schecter cautioned that the company was expecting a weak third quarter and would "continue" to look at cost-cutting measures. Since then, Lotus stock has lost over 20% of its value and continues to inch slowly down the ticker.

Many Lotus analysts are also expecting a so-so fourth quarter.

> EXPECTATIONS for the third quarter "are clearly an element."
>
> RICHARD ECKEL
> LOTUS

Some, such as Robert Therrien, an analyst at Paine Webber, Inc., think that even the revised revenue estimates are still too high. "Historically, Lotus has never been very good at cost cutting, even when the company says they are seriously looking at it," Therrien said. He added that Lotus' costs per employee are too high.

"We don't think our cost structure is out of line. One man's investment is another man's expense," Eckel argued, adding that Lotus is investing in new areas aimed at expanding the spreadsheet market. He also cited a revenue-per-employee figure of $198,000 for 1989, noting that 1990 projections are a little higher, falling in at about $200,000 per employee.

"That figure should be a lot higher — closer to $240,000 to $250,000 per employee," Therrien insisted. "In a mature market that is growing slower than initial expectations, if you want to keep profitability up, you need to cut your cost structure."

Still, although software firm layoffs are rare and Wall Street continues to express caution, most analysts are not reading much into the layoffs and hiring freeze. They are more interested in Lotus' long-term marketing and product strategies.

"The layoffs are a tiny number, and its [significance] shouldn't be overblown," said Charlotte Walker, an analyst at Labe Simpson & Co.

"These are minor layoffs — more adjustments than anything else," agreed David Cearley, a software analyst at Gartner Group, Inc.

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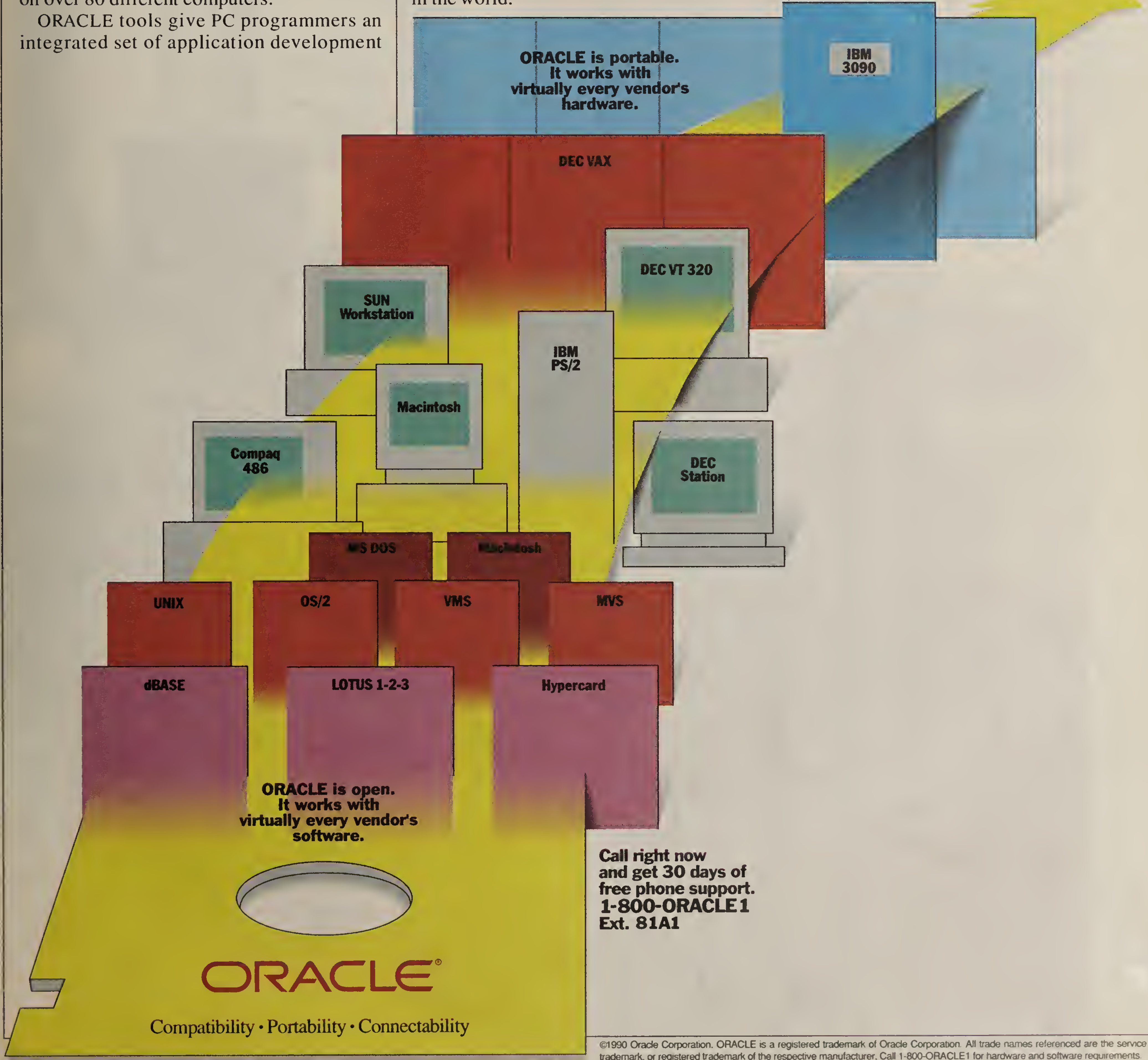
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Robert was sold on Hewlett-Packard PCs while

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Cincom takes Supra a step in the Unix direction

BY JEAN S. BOZMAN
CW STAFF

SAN FRANCISCO — Cincom Systems, Inc. recently broadened the reach of its Supra relational database management system beyond the IBM mainframe and the Digital Equipment Corp. VAX and into the Unix arena. The move, announced at last week's Cinteract '90 user meeting, is intended to support distributed database applications, Cincom executives said.

Supra will be available for Sun Microsystems, Inc. Sun-4 workstations, the IBM RISC System/6000 Unix machine, IBM-compatible personal computers based on the Intel Corp. 80386 chip and machines made by Sequent Computer Systems, Inc. and Pyramid Technology Corp. The Unix versions of Supra will be available in the fourth quarter, and pricing for the software will not be announced until then, Cincom said.

Users at the conference, most of them from IBM data centers, seemed interested in the possibility of hooking up Unix workstations to their mainframe systems. However, most who were questioned said they were not sure whether they would take that step anytime soon.

"Of course we're interested in the fact they're branching out to Unix and to PCs, but I just don't know when we're going to use those products," one Philadelphia customer said. Another East Coast user with multiple IBM mainframes seemed concerned about the announcement, adding, "I hope this doesn't mean they're going to lose their focus on their traditional base of large IBM sites."

Of more immediate interest, users said, was Cincom's announcement of a new version of Comprehensive Planning and Control System (CPCS), which allows users to manage their software systems according to IBM's AD/Cycle architecture. CPCS Version 3.0 addresses users' concerns about security and reporting facilities, said Dale Potter, manager of the CPCS product group. CPCS, priced from $24,700 to $119,000, allows users to document their software systems and coordinate application development by multiple programming groups, the vendor said.

> USERS AT the conference seemed interested in the possibility of hooking up Unix workstations to their mainframe systems.

CPCS 2.0, introduced at last year's Cinteract, only gained 30 users worldwide because of perceived deficiencies among early users. However, one of these users, Vic Gilks, an information systems director at Lloyd's Bank PLC in London, said he is pleased with the enhancements. "We find it's quite responsive now," said Gilks, who has been evaluating CPCS for nine months.

At the same time, Cincom Chief Executive Officer Tom Nies said he hopes to employ Cincom's new Unix technology to forge strategic alliances with major systems vendors — thereby boosting the privately held $168 million business.

Cincom, which has been unable or unwilling to make a public offering of its stock, now faces a need for additional funding, said industry analysts at International Data Corp. in Framingham, Mass., and Digital Consulting, Inc. in Andover, Mass. Earlier this year, Cincom sold its Net/Master business to Systems Center, Inc. for $43 million. Even without Net/Master, Cincom executives said they expect revenue to grow by 11% this year.

William Dorece, vice-president of strategic alliances at Cincom, said the Unix venture was one way to increase profits.

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ADVANCED TECHNOLOGY

TECH TALK

World's smallest lasers

■ Researchers at Bellcore in Middletown, N.J., have created an experimental array that combines 160 of the world's smallest surface-emitting lasers into a single powerful beam. The energy generated by such arrays could be used by microchips in optical computers and neural networks or to create holograms. The lasers, measuring about one-tenth the diameter of human hair, direct light off their surfaces instead of horizontally, making it possible to pack more of them onto a chip. "This most recent development could spur the continuing trend toward nearly quantum-size electronics, offering equipment that is smaller, less costly and often more reliable," said Hoi Jun Yoo, principal researcher.

Security LANs

■ Polaroid Corp. and Nynex Corp. have signed a pact to market and install Polaroid's ID-2000 Digital Security and Identification System in local- and wide-area networks. Under terms of the agreement, Polaroid will resell Compaq Computer Corp. LANs to its ID-2000 customers; Nynex Business Centers will install and service the LANs; and Polaroid will retain responsibility for supporting ID-2000 hardware and software.

Desktop video editing

■ Digital F/X in Mountain View, Calif., introduced last week what it claimed is the industry's first desktop video production system. The Video F/X system combines video, audio and graphics editing on an Apple Computer, Inc. Macintosh II with 8M bytes of memory, a 40M-byte hard disk and a color monitor. The system, which also includes two videotape recorders, video/audio control box, buffer card and video monitor, will retail for $9,995. Digital F/X also said that it is the first to license Adobe Systems, Inc.'s Postscript for exporting any Postscript graphic onto videotape.

DTM brings good things to 3-D life

Desktop manufacturing systems create 3-D prototypes instantly and inexpensively

BY MICHAEL ALEXANDER
CW STAFF

Computer-aided design and engineering (CAD/CAE) software has dramatically increased the ease and speed with which an industrial designer or engineer can create realistic representations of parts or complete products.

The problem is that a computer-generated design cannot match the look and feel of an actual, three-dimensional model, and making a prototype is often as long and laborious as CAD/CAE is speedy and easy.

A growing number of companies are finding ways to get around this prototyping bottleneck with "instant prototyping" or "desktop manufacturing" (DTM) systems that quickly translate computer images into 3-D models almost as easily as a laser printer or plotter generates hard copy from computer data.

There are several DTM technologies under development, including stereolithography, photochemical machining, laser sintering and laminated-object manufacturing.

DTM systems, which combine personal computer, laser and other technologies, are being used to sculpt objects from computer-generated models created on CAD workstations. Prototype parts can be made from plastics or with laminates, paper and other materials in a matter of hours or days rather than weeks or months.

"A lot of the processes have existed for a long time — laser, photochemistry and computer software — but no one has really been able to put them together," said Stephen Amick, international sales and marketing manager at 3D Systems, Inc. in Valencia, Calif. "Technically, it is easy to understand; it's combining them that is not easy."

3D Systems is the leading U.S. maker of Stereolithography Apparatus (SLA) systems using technology that it patented and has been marketing since 1988. The company reported revenue of $17.5 million in 1989, up from $4.6 million in 1988. Until recently, no other company sold 3-D production systems.

The first step in the process is to transfer the design for the model, which has first been created on a Unix-based workstation, to what 3D Systems calls a "slice computer" — a Unix-based, Intel Corp. 80386 PC that strips down the computer-generated model into cross sections.

The SLA creates a plastic model by training a computer-controlled laser beam on the surface of a liquid polymer that hardens when exposed to the laser beam. The model is then built up in successive layers, which can be as thin as 1/5000 of an inch, by drawing one cross section at a time. An elevator in the vat of liquid plastic lowers the model after each cross section has been made.

The computer that controls the laser is a standard, off-the-shelf IBM Personal Computer compatible with either an Intel 80286 or 80386 microprocessor running MS-DOS.

3D Systems markets three versions of the SLA, ranging in price from $95,000 to $385,000. The systems vary in workstation performance and the size of the model that they create. The models range from 7 by 7 by 10 in. on the low end to 20 by 20 by 24 in. at the high end.

Larger models must be manufactured in sections and then bonded together. That is how Mercedes-Benz, for example, created a prototype of a complete exhaust system.

Robin Jareaux

Stereolithography and other technologies can be used to produce parts considerably faster and of greater complexity and size than can be achieved using machine tools. "We can build systems to any accuracy, taking into account such variables as the width of the laser beam, the amount of shrinkage as the liquid polymer is transformed in a solid plastic, curing after production and more," Amick said. The down side is that it is difficult to design parts to extremely close tolerances, and because the prototypes are made of a brittle plastic, they often cannot be machined or used in actual testing.

Eastman Kodak Co., Digital Equipment Corp., Apple Computer, Inc., Texas Instruments, Inc. and other companies that use SLA technology said that the production systems shorten their product design cycles — saving money and enhancing their competitive abilities. Designs can be created and altered easily, thus allowing them to work out refinements that would otherwise be impractical to attempt.

A task that would normally take weeks or months to complete can be accomplished in hours or days, said Timothy Gornet, computer-aided engineering and manufacturing executive at General Electric Co.'s appliances division. The appliances division creates prototypes of knobs, handles and other parts with aesthetic value for evaluation by consumer focus groups.

Some firms that have the machines are reluctant, for competitive reasons, to talk about how quickly the machines have paid off. TI, which has four of the systems, paid them off at a rate of at four months each, Amick said.

Time over money

Companies that use DTM systems are more intent on saving time than money, Amick said. "The biggest problem in the manufacturing world is that it takes time to build prototypes in clay, steel, wood."

At Johnson & Johnson's orthopedics division, an SLA system is used to create prototype prosthetic implants for evaluation by medical organizations.

The system has enabled the firm, the leading maker of hip and knee replacement parts, to build strategic alliances with key medical organizations largely because of its rapid turnaround capability, said Salvatore Caladarise, product development manager. "We can create parts in the same week they have a meeting."

Automotive and aerospace manufacturers have been especially interested in the technology because models are expensive to produce, requiring costly tooling and lengthy manufacturing cycles. Those industries are also likely to combine in a single product a large number of complex components that have been designed and produced separately.

No one really knows how large the potential market is for stereolithography and other systems — partly because they are so new and partly because they combine a variety of technologies — so comparisons to existing industries are difficult.

3D Systems has had the field to itself for the better part of two years, but competition is showing signs of picking up.

Du Pont Co. in Wilmington, Del.; DTM in Austin, Texas; Quadrax Laser Technologies, Inc. in Portsmouth, R.I.; and Hydronetics in Chicago, as well as a number of European and Japanese firms, are developing DTM systems.

The companies working on stereolithography and similar desktop manufacturing systems hope to someday use the technology to produce finished goods, a feat that cannot be carried off easily with existing methods.

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EDITORIAL

The real Japan

WHEN WE DECIDED early this year to assemble the first in-depth look at information systems in Japan, we had plenty of reservations. We had heard a lot about the "closed" Japanese culture, reluctance to open up to foreigners, arrogance about the country's economic success and the subjugation of the individual to the group.

We couldn't have been more surprised. In fact, so many Japanese companies were willing to be interviewed that we couldn't get to them all. The managers we met were gracious, open and eager to share information. While their company loyalty was unquestioned, they also took great pride in individual achievement. Perhaps most important, they were fascinated by what's going on in the IS field in the U.S.

The obsession American business has with Japan has spawned plenty of misinformation. Americans tend to dismiss Japan's success as being a function of its culture and traditions. Lifetime employment and consensus-style decision-making won't work in this country, we say. Japan, Inc. doesn't play fair because government exists only to support industry.

Hogwash. There's a lot the Japanese do that can work here as well — for example, the attitude that markets should be viewed strategically rather than in rigid cost-justification terms. The Japanese rationale for entering a new line of business may simply be, "We have to be there."

The Japanese concentrate on meticulously fine-tuning manual procedures before automating them, with the result that automation has a dramatically greater impact on efficiency. Their investment strategies rely on relatively stable debt vehicles rather than the volatile equity markets. Government does promote investment in growth industries, but it is also quick to bail out of declining markets rather than propping up uncompetitive companies with big contracts.

The Japanese have their share of competitive disadvantages as well: poor job mobility, the low status of women, language barriers, a high cost of living and an international image problem, to name a few. There is plenty of room for American companies to gain a competitive edge in Japan, as successful firms such as Procter & Gamble and IBM can attest. But it will take an open mind about what the U.S. can do better.

Two characteristics of Japanese business professionals especially impressed our Japan reporting team. One was the nearly insatiable appetite for information about what's going on over here. Japanese IS professionals admit that they lag behind their Western counterparts, but they are determined to close the gap by adapting good ideas to their own business culture. Another was reverence for education. Japanese children attend school year-round and are subjected to brutal college entrance examinations. Firms rotate employees through different departments and overseas divisions so they can learn the business from the inside out. Nearly everyone we met spoke or read English. This is a business culture preparing to compete in a global environment.

News Item: Bellsouth drops hacker case after discovering 'stolen' information was publicly available.
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LETTERS TO THE EDITOR

The right numbers

Jay Zagorsky's Viewpoint column, "The upside of software piracy," [CW, July 2] states that economically, software developers can ignore piracy. He claims stolen software does not have a large effect on a computer company's profits because only a small fraction of illegal software represents lost sales and because piracy increases demand for future products.

Using the example of a small company with less than $10,000 in revenue, Zagorsky tries to show that a) if piracy were prevented, only a 7% revenue gain would result; b) the 7% revenue gain would be offset by the costs of the engineering talent required to prevent piracy; and c) pirated software has a positive effect on future sales, because pirates who like a product often buy future releases.

First of all, software piracy is flat-out illegal, period. Assuming Zagorsky's 7% number is valid, how would he like it if someone broke into his house and took 7% of his belongings or emptied his savings account of 7% of his money? That's exactly what piracy is to the software companies.

Let's take a $150 million software company with profits of around $10 million to $15 million annually. If I were chief executive officer, I'd gladly invest a couple of engineering man-years at maybe $125,000 per year to gain 7% more revenue. That's $250,000 worth of engineering to get $11 million in revenue — a very worthwhile deal.

Most of that $11 million in new revenue would go right to the bottom line. After allowing for the minor additional engineering costs and cost of goods sold, let's say incremental profits after taxes (we're in the 50% bracket) are $5 million. Now we are adding almost 50% to the profits! Our hypothetical company's stock price should take a healthy jump over that 50% profit increase.

Zagorsky says that, ethically, the pirating of software is a social dilemma. My friend, I hope your article was written strictly from an academic viewpoint and does not reflect your activities as "an independent software consultant."

Steven Farber
Director,
Business Development
Intellicorp
Mountain View, Calif.

Not just a PBX

The article "Defense giant pulls Profs plug" [CW, July 16] thoroughly took me aback. I didn't think extricating Profs from even a moderate-size customer would have been possible, much less from such a large organization.

The courage it took to make that decision is quite commendable. Most Profs users take the system for granted, giving no thought to the underlying costs.

I have had the experience of watching Profs grow from an IBM 4341-II to an entire 3084 processor supporting nothing else. Early on, it was apparent that the base operating system was not well-suited to the application.

It was also too late. Once infected, there was no cure, despite IBM's assurances that the next release would alleviate the pain. Management was hooked.

There is no question of the benefits of Profs and Office Automation, only a question of matching needs and requirements alongside good business practices. Profs has excellent potential but requires strict management to keep it from devouring an inordinate amount of resources. It isn't just another PBX.

Guy Goubeaux
Computer Co-operative Services
Phoenix, Ariz.

No competition

Regarding your recent article on Lotus and its legal action against Borland [CW, July 9], I think it will be a travesty of justice if Lotus wins. Borland's Quattro Pro is user-friendly, faster and a better all-around product than Lotus' 1-2-3.

Lotus doesn't seem to give a damn about the user. What logic, for instance, is there in hiding the printer set-up commands three or four layers deep in abstract menu names? The logical place for those is in a menu item labeled "PRINT," as it is in Quattro Pro.

If Lotus prevails, then I think that new and better software is gone forever, for if Lotus prevails and someone develops a new software product, that is competition. Companies won't improve their product; they will simply go whining to the courts to curb that competition.

B. J. Thomas
Sparks, Nev.

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Airing both sides of the 'look-and-feel' debate

DAVID REED

"Keep your lawyers off our computers!" cry the new prophets of doom in the personal computer industry. Shrill voices would have us believe that copyright protection of interface designs of successful software products will halt innovation and put small software companies out of business. The "spin doctors" of the trade media encourage the misconception that you can accidentally violate the copyright on a program you have never seen. Others claim that the only way to improve upon a product is to copy part of its design and add features to it.

These arguments don't make sense. I am no lawyer, but as a professional software designer for more than 20 years, I've had experience with lots of small companies, and I have seen how software innovation works.

Since the 1700s, copyright and patent laws have evolved to recognize that when an author, artist or designer creates something original, he or she is given certain ownership of the fruits of that labor. It seems fair that software designers who carefully create a useful organization of screens and menu choices should be able to prevent unlicensed use of their design. The copyright statute itself puts it best: Copyright protects "original works of authorship fixed in any tangible medium of expression, now known or later developed, from which they can be perceived, reproduced, or otherwise communicated, either directly or with the aid of a machine or device."

There at the beginning

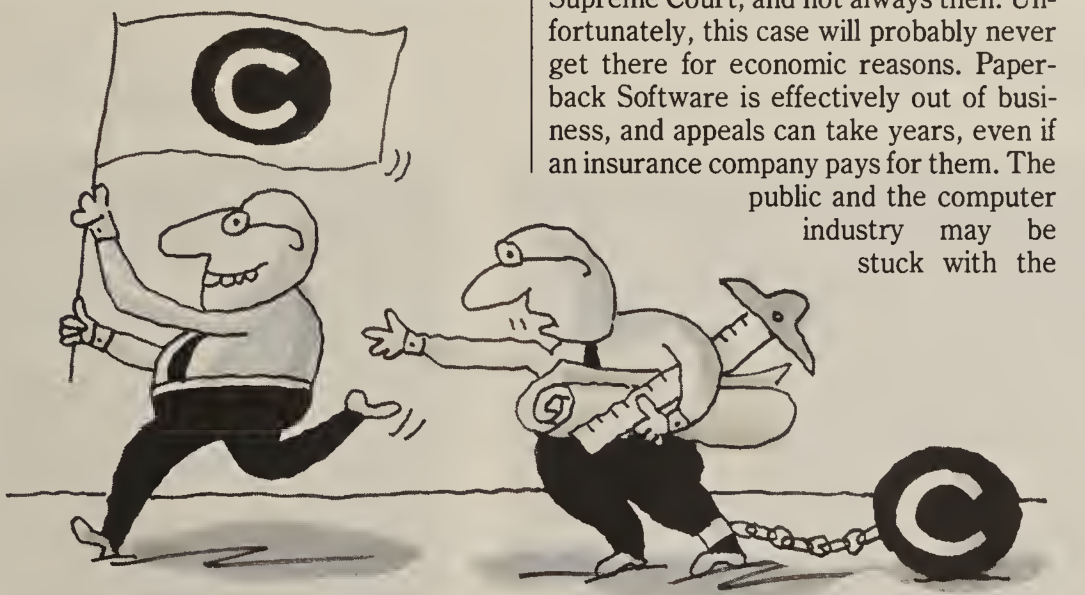
I remember the evenings I spent in Bob Frankston's attic looking at demos of an Apple II program that became Visicalc, the first electronic spreadsheet. Dan Bricklin, who originally conceived the idea, amazed me with the time and care he took to make sure that each command, keystroke and displayed prompt response would fit together into a structure that would be powerful, flexible, aesthetically pleasing and easy to learn.

Visicalc helped create the PC industry, and I remember thinking how much of the value of a good product was in the user interface design.

When Judge Robert Keeton recently affirmed the copyrightability of Lotus' 1-2-3 user interface and menus, he reaffirmed that application designers such as Bricklin own the original results of their work. This ruling is incredibly important, because it is often much easier for a group of programmers to implement a copy of a design than to come up with a good original one. While code that implements a design well is essential, there are lots of ways to implement it. It seems only fair that someone like Dan Bricklin should own the results of his authorship.

As a designer, I don't have to worry about infringing on the copyright of a program I've never seen — you have to copy significant portions of someone else's work to violate the copyright. You need to be cautious when you find yourself studying another product and copying elements of its design. It makes sense to be extremely careful if your goal is to compete with that product. If you are only using abstract ideas from that product, there should be no problem. But if you find yourself transcribing the expression of those ideas that distinguish that product from others, watch out.

Without copyright protection, small software companies would take an enormous risk introducing products. Had another company merely copied the Visicalc design and added a minor feature or two, Bricklin might not have earned even enough money to cover his expenses.



Niculae Asciu

If the only way to better a product was to copy its user interface, copyright might indeed halt innovation and restrict competition, because copyright prevents including all or part of a copyrighted work in another. As a designer, I'm challenged by trying to do something significantly better than the competition.

Most products succeed because they embody original approaches that allow you to do something an order of magnitude better, rather than offer a little bit more of the same old thing. There are many ways to add functionality to a product without copying: Companion products, add-ins and add-ons, are well-known approaches that can be very profitable.

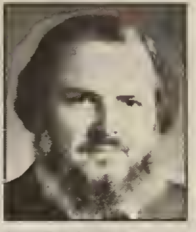
Plagiarism is prohibited in the "free press," "free speech" and even in the much fuzzier notion of "academic freedom." Why should programming be any more (or any less) free? The notion that "programming freedom" precludes designers owning their original works seems like pure demagoguery. It is an attempt to build an emotional case by likening the issue to the causes of human rights and civil liberties.

Designing and developing great business software is not a game — it's a serious business. Millions of users spend billions of dollars not to satisfy my creative urges, but to buy useful software products. The argument that companies ought to be allowed to reduce their business risk by copying another's successful design is not a good reason to change the idea that an author owns his original works.

Copyright protection allows and encourages me to make the maximum commitment to my design work, knowing that the time-honored tradition of copyright will protect my creations from developers driven more by money than muse.

Reed is chief scientist, spreadsheets, at Lotus Development Corp.

G. GERVAISE DAVIS



The recent court decision in *Lotus Development v. Paperback Software* is wrong for so many legal and technical reasons that it is difficult to know where to start discussing it. It is living proof that the adversarial jungle of a trial court is an unsatisfactory place to present highly technical concepts to a judge, who rarely has time to develop a clear understanding of the complex subject.

Hard cases like this are seldom resolved correctly until they reach the U.S. Supreme Court, and not always then. Unfortunately, this case will probably never get there for economic reasons. Paperback Software is effectively out of business, and appeals can take years, even if an insurance company pays for them. The public and the computer industry may be stuck with the many fallacies of the decision.

Emotionally, it may not seem "fair" for a second company to profit from the market created by Lotus' 1-2-3 simply by producing a "clone" program that sells for less and is based on the "ideas" of Lotus. It just so happens, however, that it is quite legal to do so unless the first program is covered by an issued patent or the second program is *substantially* a copy of the first. It is also the historical way that U.S. law has sought to foster competition and improve the availability of better products for its citizens.

Tragically, any well-funded plaintiff (such as Lotus) knows you never let the judge cut through the emotional argument that the smaller defendant is a thief trading on all the time and money spent by the plaintiff. Every time the defendant points to the applicable law, the plaintiff obfuscates the technical arguments, dazzles the judge and plays the "fairness" violin. The judge, confused but proud, looks for a rational way out of his quandary. He accuses the defendant of "strained analysis and word games," as this judge did.

The result is a decision based on rough frontier justice, in which the white hats prevail over the bad guys — regardless of the applicable law and sound public policy reasons behind legal principles.

You have to carefully study the 110-page Lotus decision to appreciate the intellectual foreplay leading to the startling conclusion that Lotus owns the exclusive right to the use of a set of common English words that describe functions (such as PRINT or GO). This even includes the particular order in which they appear and the one-letter symbols used for them, which just happen to be the first letter of each. To accomplish this legal sleight of hand, the court accepted Lotus' position that it owns: (1) the menus and all of the one-word commands on them; (2) the long prompts that describe the function of each command; (3) the form of the screens on which they appear; (4) the function key assignments; and (5) all of the macro commands.

Both the court and Lotus call this protection of the "user interface" and conclude that copyright covers the Lotus "command structure as a whole." Magnanimously, the decision agrees with Paperback Software that Lotus does not own the inverted "L" shape of a spreadsheet, but you'd better not use the F1 key for a Help function if you want to avoid the long arm of Lotus' lawyers.

The court expressly stated that the computer-using public has no right to use or develop industry standards or achieve program compatibility, based on concepts disclosed or involved in a copyrighted computer program.

This prohibition applies, according to the court, "even if no other technological way of achieving macro and menu compatibility" exists.

Chaos would result

Other evidence of a total lack of understanding of computer concepts is the court's rejection of Paperback Software's (correct) argument that a computer language is not copyrightable.

Can you imagine the state the computer industry would be in if Intel could preclude programmers from using the mnemonics of its assembly language without a license, or if AT&T required a license to use the verbs and specialized functions in C? No other company could develop its own compiler, and each computer company would have to adopt its own, completely different terms and representation of commands and functions in order to avoid copyright infringement.

The fundamental misconception of the court in Lotus/Paperback Software is that this level of copyright protection for computer programs necessarily prevents others from accomplishing the same functional result by use of the same English language commands. Lotus managed to convince a very bright but technologically unsophisticated judge that, because its one-word commands and macro functions were found somewhere in the underlying program, the use of those functional commands and similar command structure in a competing program was an infringement of 1-2-3.

This confuses protection of the underlying program with protection of the functions the program is intended to perform. One key section of the copyright law, Section 102(b), expressly states that copyright never protects functionality or the way you do things, no matter how they are expressed. The judge chose to ignore this major element of established copyright law.

What this industry needs is a little common sense on the part of the major players. You don't fight competition by filing lawsuits; you do it by making better mousetraps or spreadsheets. Lotus might try that for a change.

Davis is a founding partner of Schroeder, Davis & Orliss, a Monterey and San Jose, Calif.-based law firm specializing in computer industry cases.

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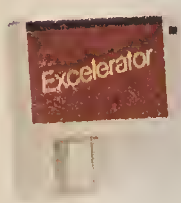

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SYSTEMS & SOFTWARE

COMMENTARY

Maryfran Johnson

New prices, new buyers?

When Digital Equipment Corp. wound down its month-long Decworld exhibition in Boston two weeks ago, it ended not with a bang but a yard sale.

In lopping off nearly a third of the $229,000 asking price on the fault-tolerant VAXft 3000, DEC may have set a company record for the steepest discount ever slapped on the youngest product.

Here it is, only six months after its glitzy rollout in Paris and a handful of weeks actually shipping, and the VAXft is now $168,00 for a full system or $132,000 for a server configuration.

Such a dramatic drop in price may lead to the obvious conclusion that the VAXft has been a flop on the customer front. But that's far too simplistic and probably wrong.

DEC insists it is quite happy with sales right now, and analysts figure at least 100 customers have ordered the crash-proof VAX — not a shabby showing for a new midrange machine that nearly everyone seemed to think was quite overpriced.

The party line at DEC is that the VAXft is being "reposi-

Continued on page 32

IMKA slow to attract backers

Expert-systems standards pioneer forges ahead, hoping others follow

BY JOHANNA AMBROSIO
CW STAFF

Standards — can't live with them, can't live without them.

That might be the lament of a consortium that is getting mixed results in its bid to attract backers for its proposed expert systems standard. The group, called the Initiative for Managing Knowledge Assets (IMKA), first announced its standard in March. Since then, only one company that was not among the initial founders has signed up.

The original five-member coalition consisted of Carnegie Group, Inc. in Pittsburgh; Digital Equipment Corp.; Ford Motor Co.; Texas Instruments, Inc.; and US West Advanced Technologies, Inc. in Englewood, Colo. Carnegie is acting as lead developer, while the other four are investors in Carnegie as well as members of IMKA. Ford and US West are users of knowledge-based systems. The new signee is AI Corp., an expert systems software vendor in Waltham, Mass.

IMKA engine

IMKA is developing an architecture to store, represent and manage knowledge in all of its forms. Robert N. Goldman, president of AI Corp., likens it to an engine for knowledge assets similar to the way a relational database engine works for data. It will incorporate a model, a language and a specific implementation that vendors and users who license the technology will be free to build on.

The objective is "to learn from the mistakes we've made with database and other technologies, where we installed different [database management systems] and found out later that they couldn't communicate," said Ted Smith, technical director of knowledge-based systems at US West. "This way we can all start off with the same base and move the industry forward."

At US West, for example, standardizing on the knowledge representation layer will allow the company to reuse chunks of knowledge in various applications. "That way we'll only have to capture knowledge once," Smith said.

IMKA released the specifications for its technology, as yet unnamed, early this month. A beta-test version for the coalition's partners is scheduled to be ready by the fourth quarter, and a product is slated to be available for sale during the first quarter of 1991. Under the terms of the IMKA agreement, any of the partners can license the technology to any party.

However, AI Corp. is the only vendor signed up that has an ex-

Continued on page 36

Imaging to help scholars — eventually

ANALYSIS

BY ELLIS BOOKER
CW STAFF

Libraries will ultimately use computer-based imaging as a way of storing, trafficking and delivering information to students and scholars.

However, the venerable hardcover book and microfilm will survive inside the library's ivy-covered walls for the foreseeable future, according to experts in the field.

"The key thing for the market to understand is that microfilm is not going to go away," said Don Willis, director of advanced technology at UMI, a reference works publisher in Ann Arbor, Mich., that has moved in recent years to digital, on-line and imaging products. "Even if we started to convert everything to image," Willis said, the process would take until the 21st century.

UMI's microfilm catalog explains the reason why. The publisher claims to have archival copies of nearly every issue and page of 17,000 periodical titles and 7,000 newspaper titles, plus nearly one million dissertations and 125,000 out-of-print books.

University Microfilms International

CDs hold *images of reference works*

Meanwhile, a handful of libraries are experimenting with the technology. The advantage of image storage is that unlike text-based databases, image databases offer viewers a faithful representation of the original document, including any photos or graphics.

Online Computer Library Center (OCLC) in Dublin, Ohio, for example, is at work on an automated system for scanning and indexing text.

"Basically, we scan the document and decompose it into its functional elements, text and graphics," explained John Handley, a research scientist at the non-profit organization. OCLC, which claims more than 10,000 library members in the U.S. and 38 other countries, will conclude its automated document architecture processing and tagging project in the fall.

Handley and others pointed out, however, that the current generation of scanning devices, with their typical 300 by 300 dot/in. resolution, are not yet capable of accurately capturing both text and gray-scale (photographic) images.

Thus, virtually all these imaging projects separate the full page image and its text at some point, sending the text to an optical character recognition (OCR)

Continued on page 33

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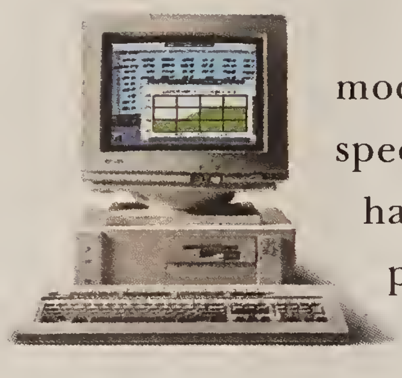

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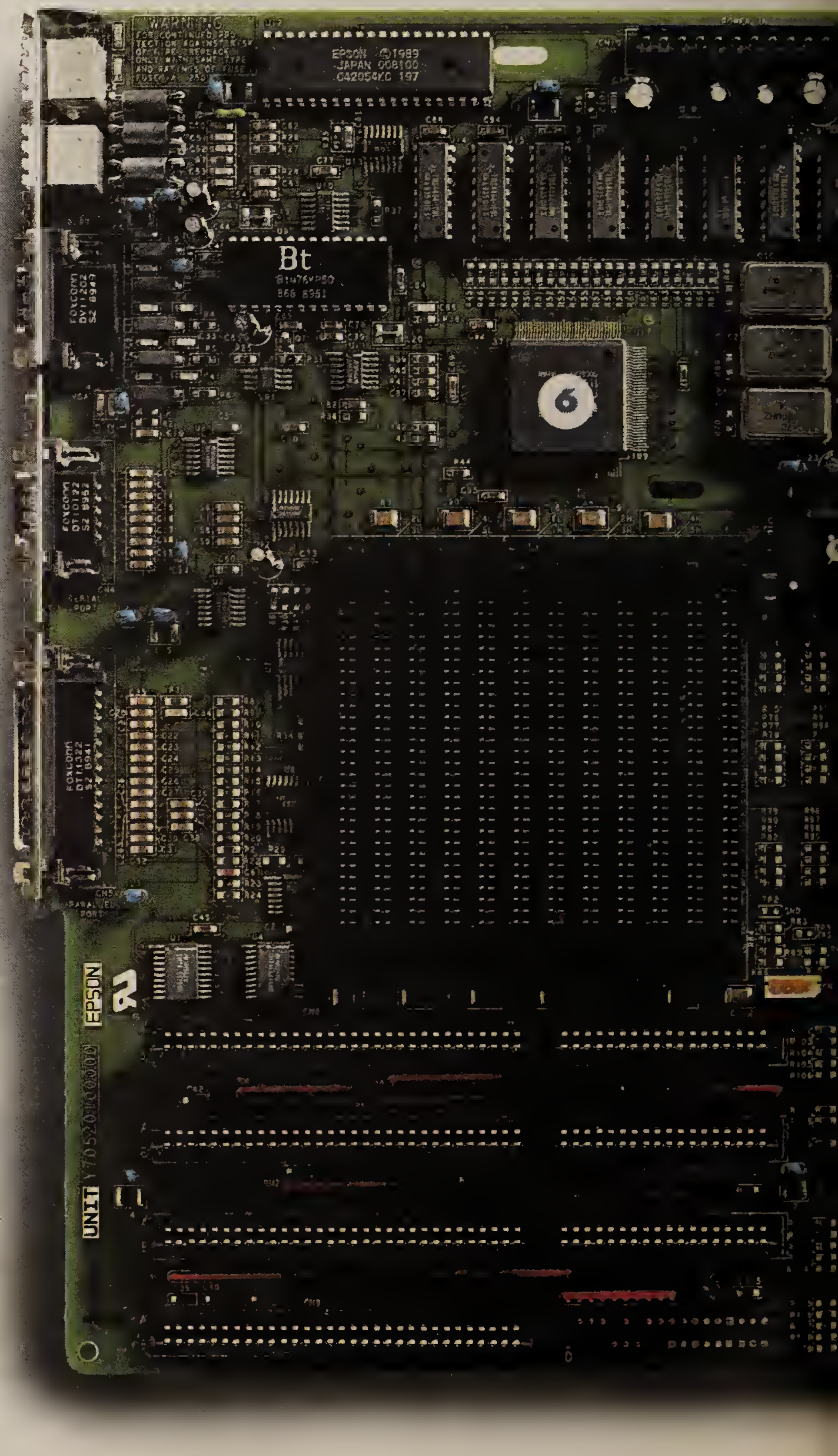

Epson's 386SX motherboard displays the elegant architecture necessary for optimal performance.

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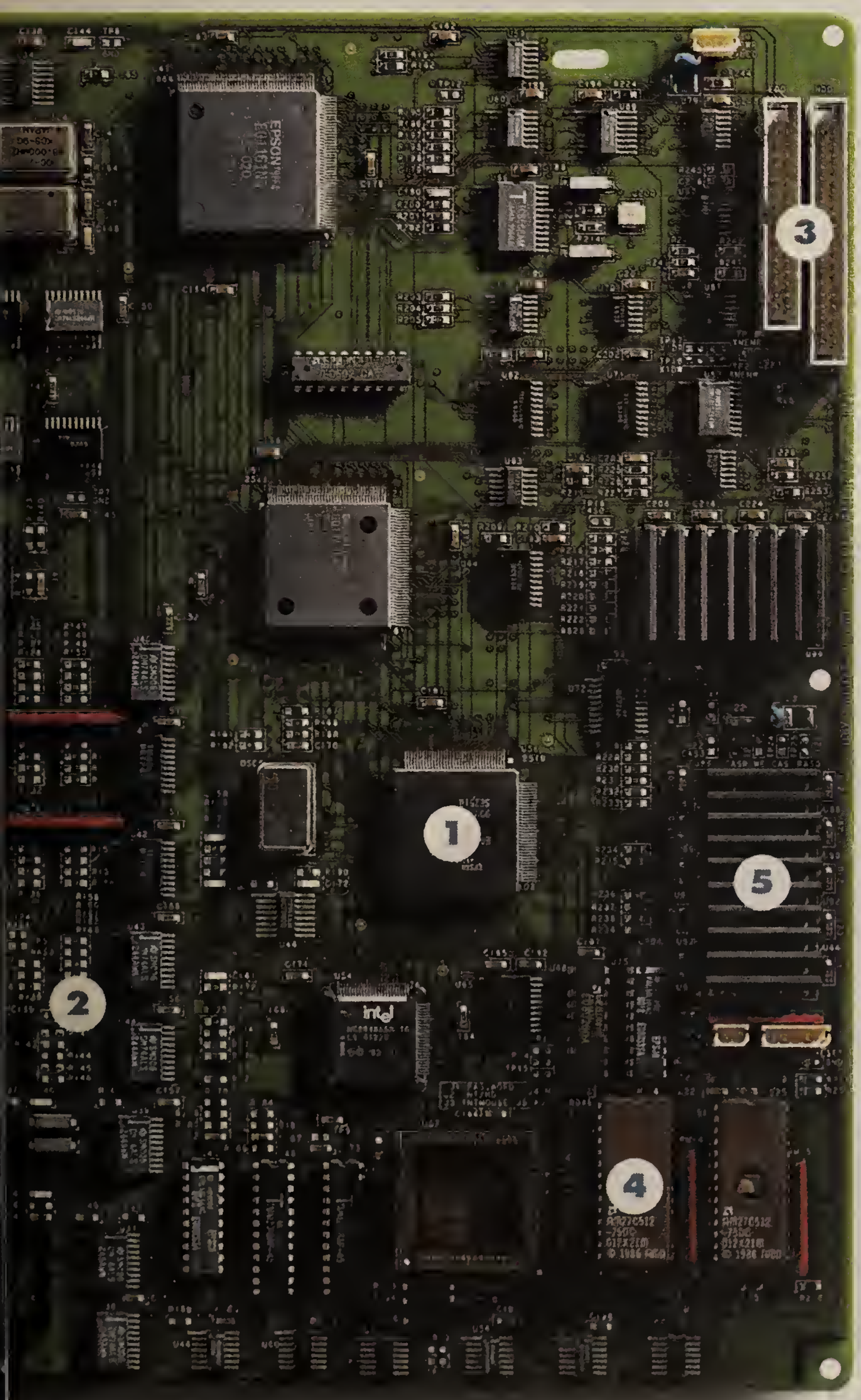

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CAD helps doctors mend bad breaks

ON SITE

BY SALLY CUSACK
CW STAFF

PAOLI, Pa. — If you've ever broken an arm or leg, you know how it feels to be confined in a plaster cast — damned uncomfortable.

At least one company is working to reduce the amount of time patients must spend encased in plaster of paris. Jim Hearn, an engineer and systems manager at Synthes, is part of a team that designs surgical implants for the skeletal system, including plates and screws that hold together a fracture zone without restricting the joint area.

The company relies on a combination of Digital Equipment Corp. VAX/VMS computers and Computervision's CIS Medusa computer-aided design software for creating implants.

These allow for movement, Hearn said, and eliminate the need for the traditional cast. Synthes is a privately held international firm in Paoli. Founded in 1975, the corporation designs and sells implants directly to both doctors and hospitals.

Both the hardware and software were installed in 1988, replacing an Autodesk Corp. Autocad system running on standalone AT&T personal computers.

"We had, and still have, two sister companies and a laboratory in Switzerland using CIS Medusa," Hearn said. "We realized we needed a similar software and hardware system to make communication transmission easier between us and them."

A global link

Now there is an international link between the two sister companies, and headquarters has also been connected with its two U.S. manufacturing plants in Exton, Pa., and Monument, Colo. All are communicating via DEC's Packetnet System Interface (PSI) public network information system over 4.8K bit/sec. lines. So far, Hearn said, the system works well. It was brought online six months ago.

The company will be sending Hearn to its laboratory in Davos, Switzerland, next month to install a Medusa system on a DEC Vaxstation 3100 Model 38 and to link the system to the newly installed company network. In addition to designing implant parts, the laboratory creates structural designs for surgical instruments.

"The big thing about Medusa is that it doesn't establish boundaries for the user," Hearn said. "It says, 'Here is the core system — change it, modify it, see what you can do.' It's a very flexible product."

Explaining that his first experience with Medusa came with the company's purchase of the product back in 1988, Hearn said that he and fellow design engineers were sent to the Prime/Computervision training center in Chicago to learn how to use the new software.

Newcomers to Medusa usually find it a bit overwhelming and complex, Hearn said, because of the large number of commands incorporated within the package. However, he said, this is beneficial in the long run because it allows for a great deal of user modification. The user can modify menus, write programs and modify the command structure.

The system also uses Clumps technology, whereby it takes both lines and text and combines them into a single group for moving design assemblies and individual components within those assemblies.

"We can actually move a screw in a screen drawing to see if it rotates or moves the joint the way it is supposed to," Hearn said. At headquarters, Synthes has installed a DEC Vaxserver 3600 as the main node for all systems, which incorporates the company's drawing and prototyping files.

Synthes' implants *hold together a fracture zone*

In Paoli, there are four satellite nodes — two Vaxstation 2000s and two Vaxstation 3100s — spread among the eight engineers. All the systems run under VMS. The company uses an IBM System/38 for payroll and other administrative activities, and there is an IBM PC-compatible network throughout the building.

The firm is also examining additional design and manufacturing technologies, such as stereo lithography, to solidify prototyping models into plastic samples for customers. Citing auto makers as one industry taking advantage of this rapid-prototyping design method, Hearns said it could also be used as an effective sales tool.

"We could bring the part to the doctor and have him or her make on-the-spot modification recommendations," he said. "It would cut down on the prototyping stage and save money on the turnaround process."

IS shop moves smoothly into $22M data center

BY ROSEMARY HAMILTON
CW STAFF

JACKSONVILLE, Fla. — The information systems staff at CSX Technology must be feeling like kids on Christmas morning.

Not only did the company recently open a new $22 million data center, but it stocked the center with all new equipment, from mainframes to tape drives, to the tune of $70 million.

But the new digs are hardly gifts from the corporate offices, noted Doug Underhill, assistant vice-president of technical services. The company, which functions as the IS division of railroad operator CSX Corp., simply timed its equipment upgrades with the move to the new data center.

The top-to-bottom switch also allowed CSX a fairly risk-free move because there was no possibility of systems being damaged as they were hauled to the new location, Underhill said. The only items physically moved were tape cartridges loaded with data for the new systems.

The IS staff began the move on a Saturday night in early July and had all 1.3 terabytes of data in the new shop early Sunday morning. By noontime Sunday, all applications were up and running.

Currently, four 3090 600Js, 16 3390 control units, 56 3490 tape drives and 100,000 tape cartridges are housed in the new center. The company had installed the new CPUs and storage devices two months prior to the move and ran a dress rehearsal to make sure there were no major equipment glitches at move time, Underhill added.

Some of the equipment at the old data center, which included 3090 S models, 3380 disk drives and 3480 tape drives, was shipped to CSX's smaller data center in Baltimore. The remaining equipment, for which CSX held leases that were about to expire, was returned to the leasing companies.

> THE TOP-TO-BOTTOM switch also allowed CSX a fairly risk-free move because there was no possibility of systems being damaged.

CSX had been planning to build a new data center because the older one, which was opened 30 years ago, was set up at the company's corporate offices in downtown Jacksonville. Space was in short supply, and neither the security nor the weather protection systems were top-notch.

"One of the reasons for building a new one was the recognition that the company is heavily dependent on continuous availability," Underhill said. "The power protection and general circumstances of a multiuse building weren't really adequate for our need anymore."

The new center was designed to achieve continuous operations, added Jack Cooper, president of CSX. It includes three generators, a well to provide an isolated water supply and enough diesel fuel to last four days, he said.

CSX chose a dry sprinkler system instead of a halon system for use in most of the data center. However, halon will be used in a few select areas where coaxial cable is installed. Water will only enter the sprinkler system when the temperature in the data center reaches 160 degrees, according to Richard Mason, assistant vice-president of computer operations. This should prevent any false alarms that could trigger the system and douse equipment with water, he said.

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The Open RDBMS

The Sybase View

Today's changing business environment demands full exploitation of multi-vendor network computing. The challenge is to integrate existing applications with new on-line systems, preserve past investments and create an open, flexible architecture for the future.

The allure of standardizing on a single RDBMS and migrating existing applications is tempting, but utopian. This "one size fits all" strategy will not preserve existing investments. And it raises the spectre of being locked into a single software vendor.

The solution: an Open RDBMS. One that provides hardware and software interoperability. One that offers a *true* open architecture and provides integration of decision support and transaction processing. One with the support of leading hardware and software manufacturers to provide heterogeneous interoperability. And one with a full range of technology integration services that can weave these heterogeneous environments into a unified computing enterprise.

OPEN ARCHITECTURE. Open architecture gives hardware and software companies — customers and competitors — access to comprehensive open interfaces. These open interfaces must be based on standards and available for extension and industry adoption. Only a network based client/server architecture, with such open interfaces, can meld an array of operating systems, networking protocols, and applications into a seamless computing enterprise.

DECISION SUPPORT. To handle real-time decision support across multiple systems, an Open RDBMS must provide interfaces that can:

- read data from any RDBMS, non-relational DBMS, or file system
- communicate with all dialects of SQL and with non-relational data manipulation languages.

TRANSACTION PROCESSING. To integrate production transaction processing applications, an Open RDBMS must provide interfaces that can:

- control inter-system transactions for concurrency, consistency and recovery
- provide access to application programs, as well as databases, to assure complete data consistency for updates
- integrate application-specific logic for custom functionality and performance
- transparently access such external data sources as real-time feeds, process control data, electronic document exchange, and mail services

MULTI-VENDOR INTEGRATION. An open system requires the full backing and support of industry leaders to ensure customers the benefits of direct interoperability. It creates a vendor-independent, open architecture that is more flexible than a single, vendor-centric approach.

TECHNOLOGY INTEGRATION. Making the open system work requires the assistance of a professional support organization with multi-vendor experience in DBMSs, operating systems, networks, and hardware.

Only SYBASE delivers on all of these requirements.

The SYBASE open client/server architecture is based on a commitment to standards. It provides enterprise-wide integration of decision support and transaction processing that marries SYBASE and non-SYBASE data, applications and services. Alliances with industry leaders like Apple, AT&T, DEC, DG, IBM, HP, Lotus, Microsoft, NeXT, Pyramid, Sequent, Stratus, Sun and over 100 independent software vendors ensure interoperability — not just portability. And Sybase's professional services division, SQL Solutions, Inc., now provides complete integration services and customer support for single or multi-vendor environments.

SYBASE. The Open RDBMS to make the open computing enterprise a reality.

THE SYBASE FORUM

This view of The Open RDBMS first appeared in The Sybase Forum (Computerworld, March 12, 1990).

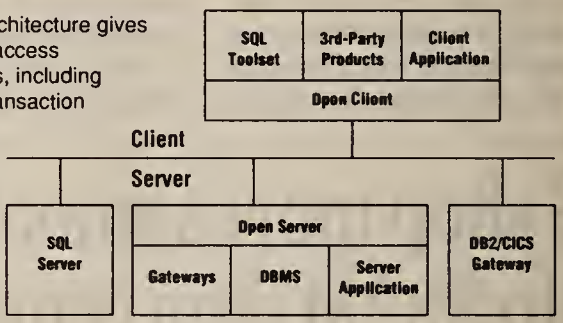
Look W
You C

SYBASE Open Client/Server Interfaces allow data and application integration and interoperability in a multi-vendor environment.

SYBASE Open Client provides an application programming interface (API) for accessing and updating data using a variety of front end tools or applications — including SYBASE applications, independent software vendor's tools, or user-written applications. **SYBASE Open Server** provides an API for accessing and updating a variety of foreign data sources and application services. Open Server can seamlessly integrate hierarchical and relational DBMSs, third party applications and real-time data feeds into SYBASE applications.

Together, Open Client and Open Server interfaces and gateways make real-time access to various data sources and application services across networks completely transparent regardless of protocol — the essence of the on-line enterprise.

The SYBASE Open Architecture gives transparent, real-time access to various data sources, including DB2 and CICS, with transaction processing capability.



INFO WORLD

FROM THE TEST CENTER

Dueling Servers

MARCH 5, 1990 THE WEEKLY FOR PERSONAL COMPUTING PROFESSIONALS VOLUME 12, ISSUE 10

"An impressive piece of work, SQL Server delivers on its claims for high-performance transaction processing. Fast, powerful, with many innovative features that are useful yet surprisingly easy to learn and use, this multiuser database server has a promising future."

SQL Server was designed to help give continuous OLTP application availability 24 hours a day, 7 days a week.

It handles maintenance operations (backups, diagnostics, design and integrity changes) while all other applications continue to run.

It protects against loss of integrity during a system failure so that all changes to the database can be rerun quickly and accurately.

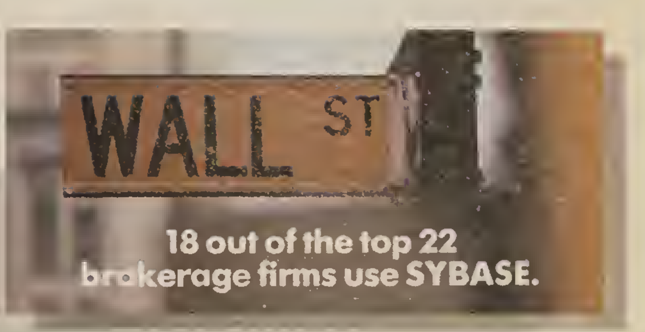
It also supports fault tolerance in media failures even when the hardware doesn't.

Sybase's professional services division, SQL Solutions, focuses exclusively on providing relational database services and tools.

SQL Solutions provides customized solutions with a complete line of SQL productivity tools that ease every step of the application development life cycle.

SQL Solutions' products support all major DBMSs across all major hardware platforms. The firm has designed, developed and integrated more relational systems in the on-line enterprise-wide network computing arena than all of the leading RDBMS vendors combined.

hat Happens When pen An RDBMS.



18 out of the top 22 brokerage firms use SYBASE.

FRONT END TOOLS

ACCELL/SQL
ACCESS/STAR
COSMOS
dBASE III
dBASE IV
DataEase SQL
EXCEL
FOCUS
JAM
JAM/DBi
NEXPERT OBJECT
1-2-3
PARADOX
Software through Pictures
SPSS-X
And more.

Today, more than ever, industries such as banking, manufacturing, telecommunications, and government are developing integrated applications for on-line transaction processing and decision support. They are, in short, managing the data needed to make successful business decisions.

For example, a typical on-line application for foreign currency risk managers must track fluctuations in a rapidly changing market, where over 15,000 currency price changes occur daily. Concurrently, decision support applications need to analyze on-line data to reduce potential risks.

What's needed is an on-line database system powerful enough to handle real-time decision support analysis—and that system is SYBASE.

That's why 18 out of the top 22 brokerage houses have chosen SYBASE. One firm uses SYBASE to track market fluctuations and to analyze appropriate responses.

"With SYBASE, the system can suggest the best combination of corrective trades under current market conditions."

THE NEWSWEEKLY OF INFORMATION SYSTEMS MANAGEMENT
March 5, 1990 · Vol. XXIV · No. 10 · 120 Pages $2/Copy $48/Year

COMPUTERWORLD

"In a preference test pitting some of the most advanced SQL-based relational database management systems against one another, SYBASE . . . came out on top in overall user satisfaction." March 5, 1990.

SYBASE earned top ratings in eight out of 18 categories:

- **Performance in processing on-line transactions**
- **Performance in decision-support applications**
- **Providing effective user-defined integrity**
- **DBMS enforced integrity**
- **Useful SQL extensions**
- **Distributed updating, recovery and remote administration**
- **Extensions to the relational database management system such as semantic, object oriented text and image modeling**
- **Performance and system monitors**

Strategic alliances with other industry leaders are critical to successful interoperability. With SYBASE, the results have been impressive.

In commenting on SQL Server, Microsoft stated: "Microsoft surveyed the entire SQL database market and chose SYBASE technology as the most powerful. SYBASE is the perfect partner to help Microsoft apply the power of OS/2 to multi-user database environments."

And Lotus, in announcing its alliance with SYBASE, said: "This partnership with SYBASE demonstrates our belief in the importance of database products as an extension of our core business, and is an important step in our effort to provide our spreadsheet users with access to diverse sources of data."

Lotus | Microsoft

In the real world of multi-vendor environments, SYBASE preserves your prior hardware and software investment while keeping your future options open.

SYBASE SQL Server supports portability to a wide range of strategic computing platforms, including VAX/VMS, UNIX, and OS/2, with PC and MAC connectivity, making it a natural for linking applications residing on different types of machines.

SYBASE SEMINAR SCHEDULE/FALL, 1990

Now that you've gotten this glimpse of what the Open RDBMS can do, we hope you'd like to see more. Please join us for a free seminar. We'll explore a host of RDBMS issues and present a demonstration of many on-line transaction processing and decision support features.

For seminar reservations, or more information about SYBASE use the coupon or call **1-800-8-SYBASE.**

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Arizona	
Phoenix	Sept 19
California	
Los Angeles	Sept 19 Oct 9
Orange County	Sept 19
Sacramento	Sept 12
San Diego	Sept 18
San Francisco	Sept 11 Oct 23
San Ramon	Oct 11
Santa Clara	Oct 4 Nov 15
Westlake Village	Oct 24
Colorado	
Denver	Sept 11 Nov 8
Connecticut	
Hartford	Oct 17
Stamford	Oct 16 Nov 14
District of Columbia	
Washington	Oct 3 Nov 13
Florida	
Fort Lauderdale	Oct 9
Orlando	Nov 14
Georgia	
Atlanta	Sept 12
Illinois	
Chicago	Oct 16
Massachusetts	
Boston	Sept 18
Burlington	Nov 7
Framingham	Oct 23
Michigan	
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Minnesota	
Minneapolis	Oct 9
Missouri	
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New Jersey	
Iselin	Sept 13
Parsippany	Oct 23
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New Mexico	
Albuquerque	Oct 16
New York	
Albany	Nov 15
Melville	Sept 19 Oct 24
New York	Sept 13 Oct 9 Nov 6
Rochester	Oct 2
Syracuse	Oct 18
Tarrytown	Sept 25 Nov 8
North Carolina	
Research Triangle Park	Oct 4
Ohio	
Cincinnati	Sept 13
Cleveland	Oct 2
Columbus	Oct 17
Oregon	
Portland	Oct 2
Pennsylvania	
Philadelphia	Oct 16
Pittsburgh	Oct 31
Tennessee	
Memphis	Nov 7
Texas	
Dallas	Nov 13
Houston	Oct 23
Utah	
Salt Lake City	Oct 17
Washington	
Bellevue	Oct 31
Seattle	Sept 12
Canada	
Calgary	Sept 11
Edmonton	Nov 6
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Ottawa	Sept 18 Nov 22
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Johnson

CONTINUED FROM PAGE 25

tioned" at a more sensible cost to establish new markets in midrange fault-tolerance: government, telecommunications and manufacturing, in particular.

This is really a glimpse of long-term strategy a la DEC.

On the surface, the company is scrambling to recover from a marketing misstep that allowed its competitors to sneer at the VAXft 3000 as a "point product" or single offering, with ludicrous price/performance to boot.

Farther out on the horizon, however, DEC officials see the cost to produce fault tolerance dropping while the customer appetite for crash-proofing certain applications is growing.

"In some applications, the additional benefit of fault tolerance outweighs whatever the cost is," says Jim Hammons, an analyst at The Sierra Group, Inc. "But the fact that cost is now falling suggests that as the difference between benefit and cost drops, the willingness to spend a little extra will appeal to a broader range of the marketplace."

What DEC hopes to do is sprinkle the VAXft 3000s like seeds over fertile user ground where VAX/VMS is already the proprietary operating system of choice. As yet, there are no signs that DEC will provide Unix-based fault tolerance, which several of its competitors are already supplying. So rather than trying — and very likely failing — to proclaim itself a dedicated fault-tolerant vendor such as Stratus or Tandem, DEC envisions an affordable crash-proof VAX wiggling its way into existing Vaxclusters.

The company may make a publicity fuss about plowing virgin ground with new accounts, but with 15,000 clusters already out there, that business alone could keep DEC profitably occupied for years. The VAXft 3000 may also wedge the company into new accounts with sales potential for regular VAXs, particularly where users need the large-scale database absent from the VAXft.

"Fault tolerance is like the camel's nose in the tent," says Wayne Kernochan, an analyst at The Yankee Group. "[DEC] hopes to get the whole camel in there by sticking fault tolerance in and getting the Vaxcluster to follow."

"DEC has identified fault tolerance as something that will eventually be ubiquitous throughout the VAX line," says Terry Shannon, an analyst at International Data Corp. "This is no longer a niche market for them."

The price plunge is certainly great news for users as well, though it would be tough to find any who paid full price for the VAXft in the first place.

DEC customers are happily reporting a good bit of IBM-style wheeling and dealing from their vendor these days. In the aftermath of the Decworld yard sale, the firm is promising to do right by any customers who feel they got a raw deal by buying a VAXft early on.

With the addition of the server configuration, DEC is also acting on its observation that fault-tolerant users were employing the machine as a server anyway.

The only real difference between the two machines is software licensing. Users cannot log on to the server; instead they must access it through other computers on the network, while the multiuser system has direct connection through user terminals.

"This is like what DEC is saying with its minicomputers now," Hammons observes. "If minis aren't for everyone, well, here's a server instead. DEC is giving the market what it wants rather than trying to tell it what it *should* want."

Johnson is a *Computerworld* senior writer.

NEW DEALS

GSA grants $48M contract

Computer Sciences Corp. won a $48 million contract from the General Services Administration (GSA) to provide software development and support services for scientific and engineering applications. The work will be done for the GSA's Pacific zone, which includes the Western states, Hawaii, Alaska and Guam. The deal is a one-year contract with three one-year options.

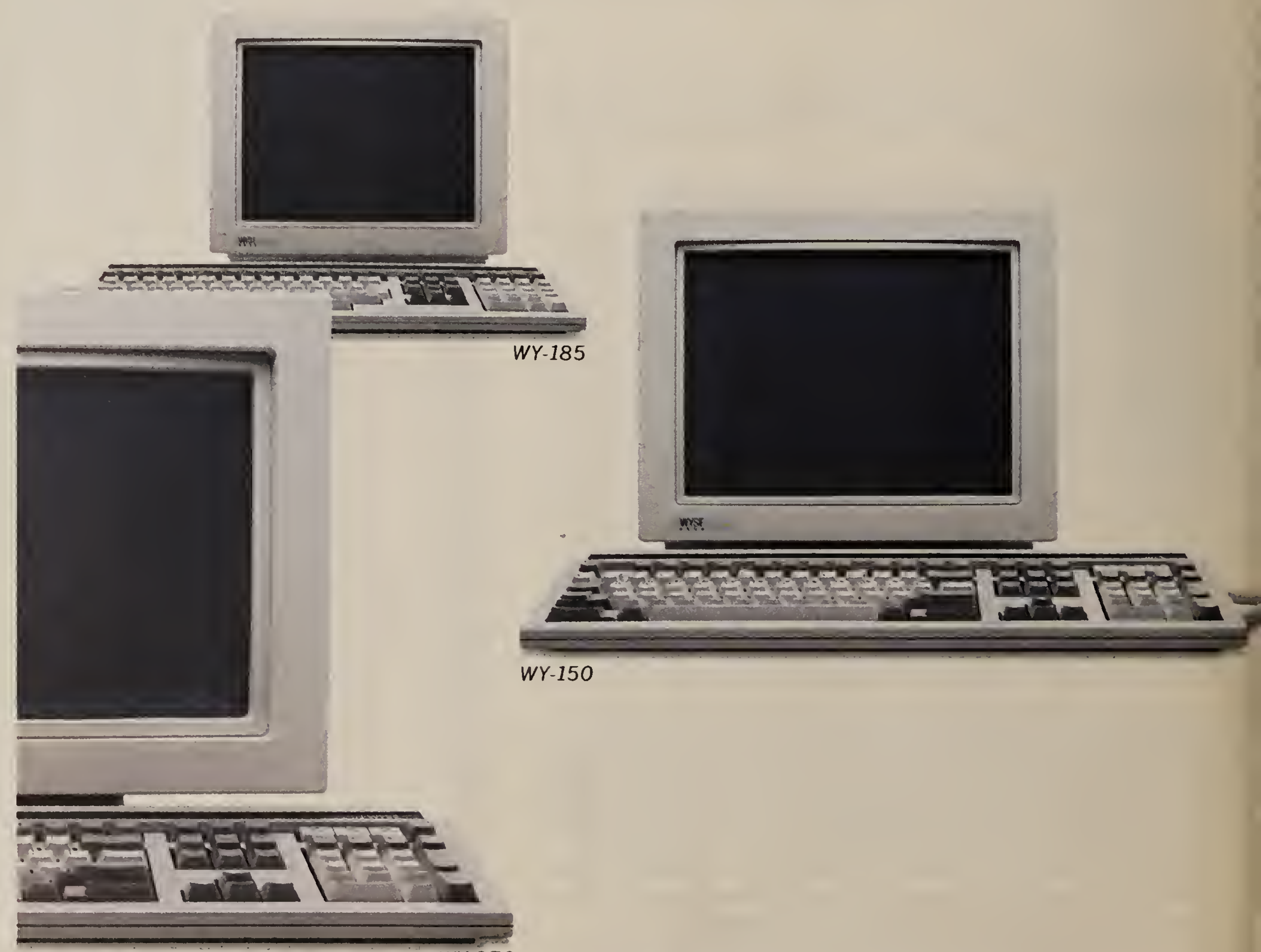
Nippon Steel Corp. in Tokyo bought a **Tandem Computers, Inc.** Nonstop VLX system for use with its sales and distribution network.

The company also sold several Nonstop systems to the Sumitomo Trust and Banking Co. in Tokyo. The bank will install the systems in its Tokyo, New York, London and Singapore offices. Initially, the systems will be used for the bank's international financial transactions applications.

NCR Corp. won a $10 million contract from Fleet/Norstar Financial Group to provide its branch offices with automation systems.

Money Quik selected NCR automated teller machines (ATM) for retail locations on the West Coast. The $5 million contract will provide 180 NCR 5070 interior ATMs in its department stores.

Wyse sets the standard in terminals again.
And again. And again. And again.



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Imaging

CONTINUED FROM PAGE 25

device for conversion into computer-readable ASCII code. Typically, this text is stored in a database that can search for key words. The user can also see the associated page image, which is generally stored on compact disc/read-only memory (CD-ROM).

The library imaging projects deal primarily with periodical literature or portions of books. Experts said current OCR systems are too slow — taking several minutes per page — to be feasible for book-length documents.

Nevertheless, the possibilities of imaging in library settings continue to be explored and demonstrated. During the past 1½ years, for example, Apple Computer, Inc. has explored the possibility of an image-based library system as part of the Apple Library of Tomorrow project, in collaboration with the University of Michigan.

"We wanted to demonstrate it was feasible," said Victor Rosenberg, a professor in the school of information and library studies at the University of Michigan. Rosenberg, who is also president of Personal Bibliographic Software, Inc., a company he founded to develop retrieval software for libraries, said he saw a line pointing in the direction of library imaging.

Right now, he observed, libraries are able to get bibliographic citations on-line and can use these to order the original text from reference publishers such as UMI or from other libraries.

"They order photocopies that come through the mail," Rosenberg said. "The next step is, instead of mail, to get them over the fax." The final phase will be to have documents faxed as images directly into the personal computer or workstation.

Such an application is currently being tested at the National Agricultural Library in Beltville, Md. In conjunction with North Carolina State University in Raleigh, the library is using the Internet data network to move selected works among workstations.

"The idea," explained Sarah E. Thomas, associate director for technical service at the library, "is that a scholar at North Carolina can put in a request and get an image on his or her workstation." Digitized images, she added, will be of a better quality than the faxes the libraries now send to one another.

One vendor hoping to take advantage of the library imaging trend is UMI. Formerly known as University Microfilm International, the firm has begun moving to other media. Last March, UMI introduced its eighth digital product, Business Periodicals Ondisc — a CD-ROM database containing indexes and abstracts for articles from more than 800 business and management journals. In addition, the 160-disk set features a full text image database for more than 300 journals.

"High usage" works will increasingly be available in a CD-ROM format that users will access through a workstation, Willis predicted. However, a single electronic index will point to both the microfilm and electronic text or image databases, he added.

Wyse became the number one manufacturer of general purpose terminals by repeatedly redefining the state of the art in terminal design. Not just in one category, but across the board. And with the four terminals that make up our fourth generation, we've done it again. ■ Each one represents the ultimate achievement in its class. Our WY-150 sets the standard for alphanumeric monochrome terminals. The WY-370 brings unprecedented functionality in color. And the WY-185 is the most advanced DEC-compatible. ■ Our newest entry, the WY-160, offers a combination of features found in no other monochrome terminal. It lives up to Wyse's well-known ergonomic standards, with its full-screen overscan, fast refresh rate and high resolution. It has the flexibility to support more than 16 ASCII, ANSI and PC emulations, as well as PC and Tektronix graphics. And it raises performance standards with the fastest baud rate in the industry, plus a dual-session capability that allows you to access two hosts simultaneously. ■ Of course, the reason we keep raising our standards is to meet yours. And since we make more terminals to fit more system configurations than anybody else, we're sure to have the one that fits yours best. Call us at 1-800-438-9973. Because if you thought you'd seen everything in terminals, we have four reasons to look again.

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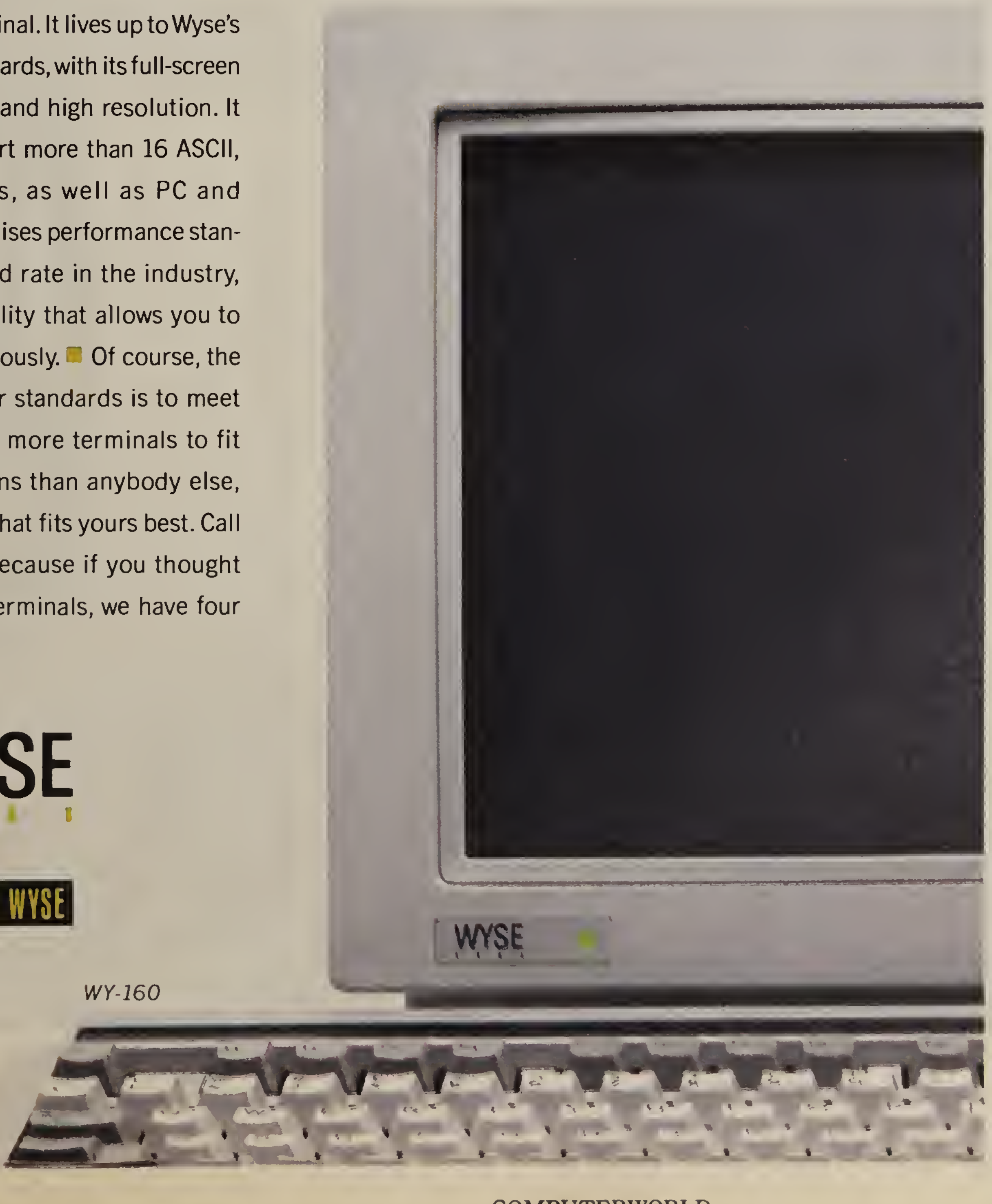

Supercomputers for tomorrow

BY GARY H. ANTHES
CW STAFF

State-of-the-art supercomputers in the year 2000 will have more than 256 processors, each no bigger than 16 cubic centimeters, according to a report from The Superperformance Computing Service (SCS). Those systems of the future will have one terabyte to 100 terabytes of memory and will boast speeds of 10 trillion floating-point operations per second (TFLOPS) to 100 TFLOPS, SCS said.

Getting there will require heroic feats of engineering, the report said. The processor in the forthcoming Cray Computer Corp. Cray-3 occupies 16 cubic inches and boasts a cycle time of 1 nsec. To get to ½ nsec would require shrinking the CPU to one cubic inch, SCS said.

The supercomputers and other parallel processors will move toward standard architectures but will allow specialization through field additions of customized processing modules for graphics, superscalar computations, animation, speech input and output, image and data compression and encryption, according to the report.

At $100 per MFLOP, a high-end supercomputer's price tag of $100 million will seem cheap, the report said.

Switching times in the fastest systems will decline from a range today of 60 picoseconds to 150 psec to as low as 10 psec by the year 2000, SCS said. Chip densities will grow to one million gates per chip, compared with 1,000 gates per chip today.

Despite these impressive gains, the SCS report said that supercomputers will have to wait more than 10 years for wafer-scale integration, photonic switching and computing, superconducting switches and quantum-effect switches. "Brute force will reign," SCS said.

SCS, a market research firm in Mountain View, Calif., said it based its projections in part on the goals of the Semiconductor Research Corp., whose members include IBM, AT&T, Control Data Corp., Digital Equipment Corp., Hewlett-Packard Co., Texas Instruments, Inc., Intel Corp., National Semiconductor Corp. and Motorola, Inc.

HP's RISC puts unprecede
HP's NewWave Office puts

nted power within your reach. it within everyone else's.

With most computers, you have to give up power to save money. And whatever level of power you settle for, it's usually difficult for anyone but an expert to use.

Hewlett-Packard has a better way.

Our full line of RISC-based computers offers a wide range of power levels. At prices that let you base your choice on performance rather than budget.

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37 computers give you the choice of power you need.
That's a pretty impressive number of RISC systems. But the numbers that will impress you more are right on your bottom line. Our RISC minicomputers start at under $15,000. Our high end of the power spectrum gives you mainframe performance at minicomputer prices.

Of course, the initial price is only one part of the equation. Since RISC architecture is simpler, it's fundamentally more reliable. And that means lower maintenance and service costs. In short, a dramatically lower cost of ownership.

If you think you can get these advantages from DEC and IBM, think again. DEC doesn't offer a complete range of RISC systems. And IBM only offers RISC technology in workstations.

The competition can't offer you the same level of software compatibility, either. If you went with IBM, you'd have to migrate across different families to even approach the range of computing power we can provide in a single compatible HP systems family.

Finally, power that people find easy to use.
That's the whole idea behind HP NewWave Office system. Its unique object-based technology lets all of your information resources work together. And gives users a consistent interface across mainframes, minis, workstations and PCs.

It also integrates information from your current applications and integrates existing DOS applications, regardless of the vendor. (IBM OfficeVision does not support DOS.) What's more, HP NewWave Office is based on industry-standard networking, and runs on HP's UNIX* system-based computers, HP 3000 systems and OS/2 operating systems.

Beyond this, HP NewWave Office incorporates an extraordinary new "agents" capability. Agents can handle a wide range of sophisticated tasks. For instance, they can automatically gather data, analyze it, generate a report and distribute it.

The net result of HP's approach is this: Applications and information are right where people want them—at their fingertips. Which puts real power where it's needed most. The kind of useful power you always hoped to get out of your company computer system.

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IMKA

CONTINUED FROM PAGE 25

isting product that will be retrofitted with IMKA technology. TI and DEC are building their systems from scratch, with the IMKA architecture as their base.

Complicating things even more is the fact that IBM is developing a potentially competing expert systems standard, the Knowledge Representation Language. It is part of IBM's recently announced The Integrated Reasoning Shell, a tool kit used to build expert systems applications.

Not all vendors seem willing to rebuild their products. Garry Hallee, chief technical officer at Aion Corp., said, "We have been talking with IMKA through the Carnegie Group and are continuing to look at their proposals. But there are certain conflicts with the technologies used in our product and their specifications. For example, ours is object-oriented; theirs is more semantic. Ours is backward-chaining; theirs is forward-chaining."

The basic problem, Hallee said, is that "it's hard to say something is a standard when the major players weren't involved in developing it. If a whole bunch of us had gone off together and worked on this, then it might be more of a group process. I'm not saying we're not going to work with them, but it's difficult when you've got an existing product and nobody consulted with you when they were developing their standard."

Smith said, "The IMKA proposals include low-level, common denominator-type technologies used by a fairly large portion of the industry. We're encouraging the participation of both vendors and large users to develop the technology even further." He said Fortune 1,000 firms are considering joining IMKA.

Alex Lilley, IBM's manager of knowledge-based systems marketing in Palo Alto, Calif., said, "We've talked to IMKA in a preliminary manner. We haven't seen their spec yet, but we'll look at it. It does sound like there's some commonality between what we're doing, but it's too early to say anymore." He added, "Over time, there will be an evolution of standards in this area, but I'm not sure we have all the technology locked down yet to be able to really define those standards."

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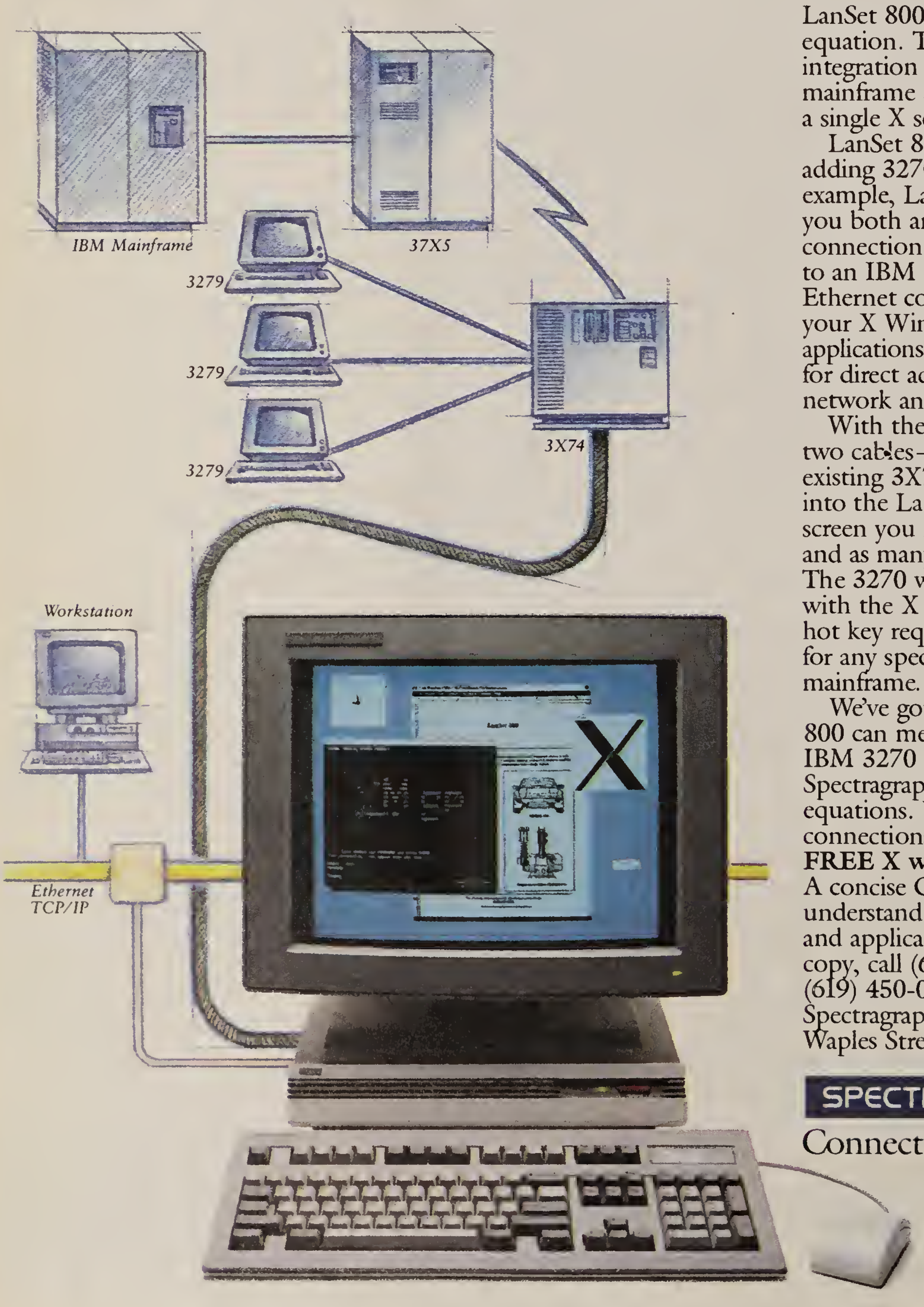

LanSet 800. A new X Window equation. To give you full integration of X Windows and mainframe 3270 connectivity in a single X server.

LanSet 800 has several ways of adding 3270 functionality to X. For example, LanSet 800/3270dc gives you both an Ethernet TCP/IP connection and direct connection to an IBM 3X74 controller. Use the Ethernet connection for access to all your X Window and other UNIX applications. Use the IBM connection for direct access to your SNA network and SNA applications.

With the LanSet 800/3270dc, two cables—Ethernet and your existing 3X74 coax—plug directly into the LanSet X server. On the screen you have a 3270 window and as many X windows as you like. The 3270 window is fully integrated with the X environment, with no hot key required. There's no need for any special software on your mainframe.

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NEW PRODUCTS — HARDWARE

I/O devices

Decision Data Computer Corp. has announced the DDCC 6550, a dual-tractor dot matrix printer that can process twin-axial or parallel data for multiform dual-printer applications.

Features include four paper paths and print speeds of 500 char/sec. in data processing mode and 150 char/sec. in letter-quality mode. IBM 4214 emulation allows twin-axial attachments to IBM System/36, 38 and Application System/400 hosts. IBM Proprinter emulation allows the printer to be connected to an IBM Personal Computer via a parallel interface, according to the vendor.

The printer is priced at $3,900 with a single tractor. Additional tractors cost $135 each.

Decision Data
410 Horsham Road
Horsham, Pa. 19044
(800) 523-5357

NEW PRODUCTS — SOFTWARE

Applications packages

Contemporary Software Concepts, Inc. has announced an integrated software package designed for use by membership organizations.

Cameo enables users to perform word processing, membership activities and organization accounting with a minimal amount of data entry, according to the company.

A membership module can be interfaced with a proprietary accounting software package and Office, an office automation software package from Wang Laboratories, Inc.

Cameo runs on any Wang VS expandable system. Pricing ranges from $8,000 to $14,000, depending on CPU size.

Contemporary Software
6 Valley Forge Executive Mall
676 E. Swedesford Road
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(215) 687-6000

Development tools

Chestnut Software, Inc. has announced the release of Lisp-to-C Translator, a tool designed to assist artificial intelligence developers who work on standard Lisp computing platforms such as Sun Microsystems, Inc. Sun 3 or Symbolics, Inc. machines.

The product can reportedly translate Common Lisp language into ANSI standard C language. Developers can compile the generated code on a target platform and link it to a runtime library to produce a complete application, according to the vendor.

A single-copy, original-platform license costs $75,000, and a project team license that includes 10 copies sells for $100,000.

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   - **65.** Communications Systems/Public Utilities/Transportation
   - **70.** Mining/Construction/Petroleum/Refining/Agric.
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   - **85.** System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - **90.** Computer/Peripheral Dealer/Distr./Retailer
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   - **95.** Vendor: Other ____________ (Please specify)
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   - **23.** Dir./Mgr. Sys. Development, Sys. Architecture
   - **31.** Mgrs., Suprv. of Programming, Software Dev.
   - **32.** Programmers, Software Developers
   - **60.** Sys. Integrators/VARs/Consulting Mgt.

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PCs & WORKSTATIONS

COMMENTARY

Richard Pastore

Put a plug in it

Has anyone ever sat through a personal computer trade show conference and learned anything useful? These shows are always described in brochures like this: "A panel of experts from leading organizations will discuss major trends in personal computing and provide you with a peek at upcoming products." Baloney.

The "experts" listed in the program invariably turn out to be high-level marketing hacks from four or five PC vendors. Usually one or two get replaced by low-level marketing hacks at the last minute. And the one guy you halfway wanted to hear doesn't show up at all.

The panel of experts has only two goals in mind: 1) Plug the company. 2) Plug the company's products.

This two-hour slide-and-dance show is typically emceed by an editor of some trade journal you don't read. The host, who seems embarrassed to be there, has all the charm of Regis Philbin with a bad head cold and a hangover.

I recently attended such a conference at the Engineering Workstation show in Boston. The host apologized for the late start, made some insightful

Continued on page 44

IXL locates missing data links

Database analyzer finds correlating data to form decision support rules

BY RICHARD PASTORE
CW STAFF

Finding the proverbial needle in the database haystack is tough enough. But finding broken pieces of several needles and matching them up seems impossible. However, a database analyzer from Intelligence Ware, Inc. claims the ability to locate and put the pieces together and provide users with decision-support rules to boot.

The program, IXL, uses statistical analysis and artificial intelligence to search databases automatically for patterns and correlations of data. Then it uses algorithms to generate pattern-based rules that users can employ for decision support. Version 1.0, a beta-test version, was released two years ago. Version 2.0 debuted May 1.

IXL differs from a query language such as SQL because it forms its own queries and executes them automatically. Though users can suggest specific search parameters such as ZIP codes, they need not know a query language or statistics to operate the program, the Los Angeles-based firm said.

Users said the software automatically found valuable information they would have had difficulty discovering manually.

However, they complained that the relatively unique product concept is difficult to explain and document.

At the U.S. Army and Air Force Exchange Service in Dallas, IXL is searching military personnel demographic data to find buying patterns. The Exchange is the main retailer for U.S. military installations throughout the world, controlling about 17,000 stores and serving 2 million to 3 million customers.

The program examines the age and sex of military personnel and correlates them with pur-

Continued on page 44

FEATURE: HIGH-END PCs

The psychology of an innovator

BY JAMES DALY
CW STAFF

Call it the new car syndrome. There has always been something about the look, smell and lines of next year's model that makes hearts pound. Desire shifts into overdrive as the old gets swept away by the new in a passionate drive for the latest and the greatest.

That same heady feeling also exhilarates those driving the leading edge of personal computer technology.

What is in an organization's makeup to cause it to go where few have gone before? It runs the gamut from researchers who harbor a childlike fascination with the experimental to users with more philanthropic goals, observers say.

"There's something very intoxicating about going into new technological waters," says Dr. Dan Masys, director of the Lister Hill National Center for Biomedical Communications in Bethesda, Md., which is exploring the brave new world of artificial reality for advanced surgical procedures and education.

The center uses a networked arrangement of graphics-intensive Sun Microsystems, Inc. and Silicon Graphics, Inc. workstations for educational and diagnostic purposes. Artificial reality, however, would make these procedures seem Neanderthal.

The still-experimental three-dimensional technique involves the ability to program a custom universe into a computer. Users throw on a high-tech bodysuit that senses body motions and feeds them into a computer that interprets movements as commands. Video display goggles are worn that reflect the commands, and the newly created world suddenly snaps to life.

"It would be a real-life *Fantastic Voyage*," says assistant director Chuck Herbert, referring to the old science fiction movie in which scientists are miniaturized, placed in a capsule and injected into an ailing man. "There would be the sense of actually moving around within the human body."

For a customer base that once waved the slogan "You'll never get fired buying IBM" as its conservative banner, sparkling innovation

Continued on page 40

M.E. Cohen

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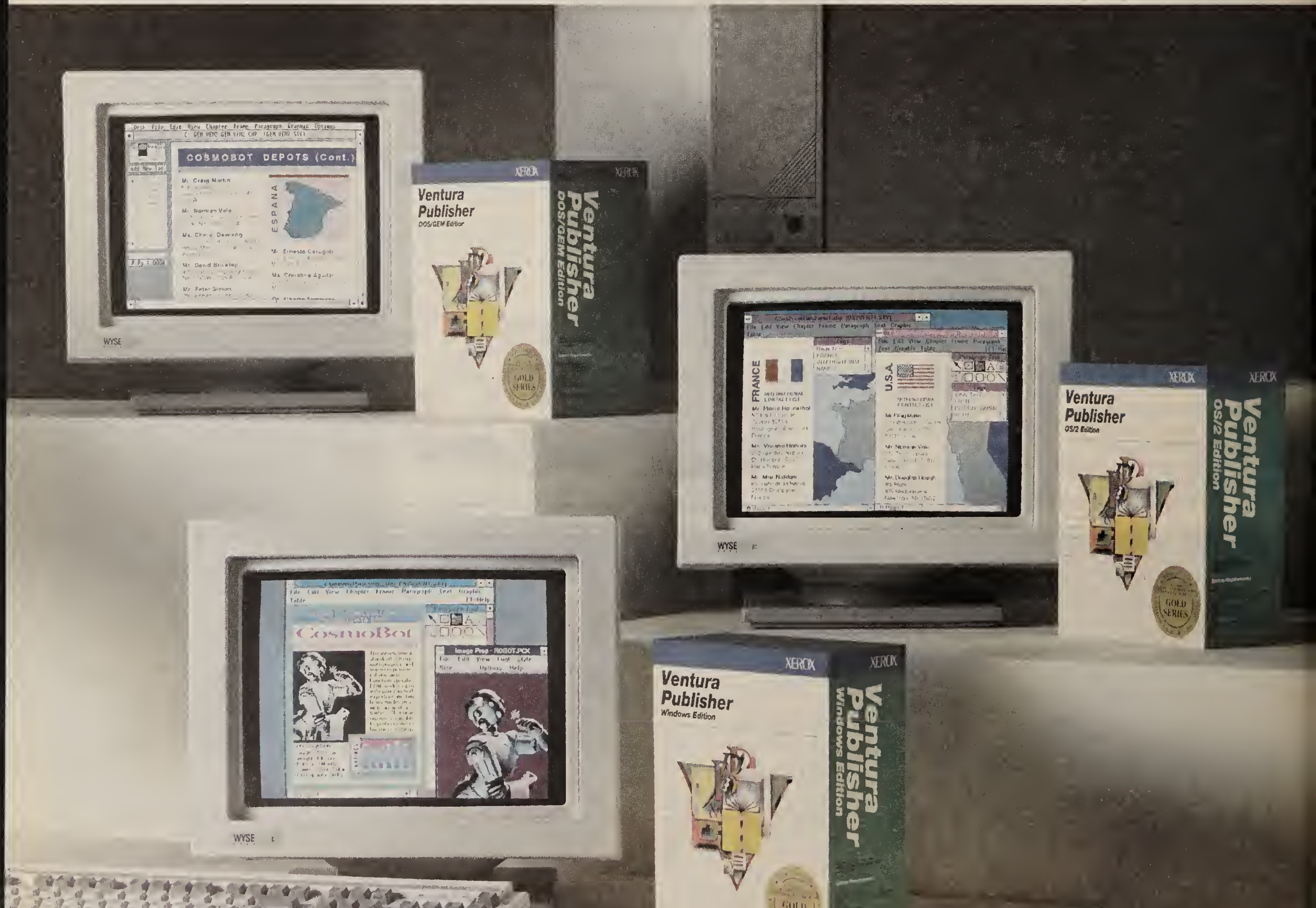

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Unix sorts Army day-care files

World's largest child-care system was developed with portability in mind

ON SITE

BY SALLY CUSACK
CW STAFF

FORT BENNING, Ga. — Six years ago, John Bush decided that AT&T's Unix System V operating environment was the platform best suited for coordinating the U.S. Army's voluminous day-care records.

"We thought Unix would become a multiuser standard," said Bush, deputy director of personnel and community activities at Ft. Benning, "but at the time, the army thought in terms of mainframes and personal computers."

Initially, the Army's Community and Family Support Center in Washington, D.C., had the idea that the program should be maintained on databases and stand-alone PCs in a DOS world, Bush said.

The U.S. Army has the largest child-care system in the Western world and has been providing day-care services in one form or another since the turn of the century. However, the army did not begin to coordinate the programs and automate data collection records until approximately five years ago.

Bush, who said he had been planning to automate several child-care facility operations on a Tandy Corp. 6000 machine running The Santa Cruz Operation's Xenix at Ft. Benning, put together a demonstration package for the Washington staff based on the Filepro Plus software package from The Small Computer Co. in Hawthorne, N.Y. Bush said he has been using Filepro successfully since 1984.

Filepro is a combination database management system and application development environment. It operates with several different versions of Unix, including Xenix, IBM's AIX, Digital Equipment Corp.'s Ultrix and Sun Microsystems, Inc.'s Sun OS, as well as DOS and OS/2 platforms. The product was designed with portability in mind, according to the vendor, and an application developed on one platform can be easily ported to any operating system supported by the Filepro Plus package.

"Back then, our main concern was true Unix-to-DOS portability," Bush said. "It was a bigger issue than it is now. We had looked at a couple of other software systems, including [Barrington Systems, Inc.'s] Clarion and [Fox Software, Inc.'s] Foxbase, before we committed to the Filepro program."

Bush and senior programmer Steven Von Neumann have now seen the software system installed at approximately 100 of the Army's 300-plus day-care centers across the country. Operating essentially as a point-of-sale (POS) system on Intel Corp. 80386-based machines, the software generates a bar-code label to identify each child.

This is transferred to a laminated card, which in turn is used for logging arrival and departure times at the centers. The bar code is also used to record the child's age, sex, immunization records and billing history, as well as pertinent information on U.S. Department of Agriculture food support programs.

"We had to convert a DOS installation at Ft. Carson. There were several sites out there using Filepro Plus on DOS-based machines, and they all wanted to use Unix," Bush said. "Von Neumann was able to go in and convert the entire Ft. Carson system over in a three-day Memorial Day weekend. The software just rolled right over onto Unix and looked, felt and acted the same as the program under DOS," he said, adding that beyond learning a few commands under the new system, no employee retraining was needed.

The typical center has between 100 and 300 children and maintains a 386-based PC that serves as the central computing device for an average of four or five terminals. Smaller sites, serving less than 50 children, use a single PC.

Keeping the records current and accurate is an ongoing challenge for the military. Programs are offered in a variety of flavors — full time, part time, before school, after school, summer camp and field trips —and are always changing to suit the fluctuating needs of the highly mobile clientele.

"The system saves us days and weeks of administrative functions at the back end," Bush said. "For example, if a commander wants to know day-care usage by junior enlisted personnel, we can provide the numbers without having to pull out a pen and pencil and tons of files."

Though the army's primary objective was to eliminate manually collected statistics reporting, Bush said that the real trick was to get a bar-coded POS system that was not cumbersome or complicated and didn't slow things down when checking children in and out of the centers.

The number of posts using Filepro is expected to increase to more than 200 within the next few years.

Dearth of trade skills stymies Soviet PC flow

BY LINDA LEWIS
IDG NEWS SERVICE

MOSCOW — Many exhibitors at the first PC World Forum held two weeks ago in Moscow said they are taking a wait-and-see approach as the country tries to move toward a regulated market economy.

The major problems hindering business with the Soviet Union, show exhibitors said, are financing contracts with hard currency and the lack of a distribution infrastructure for products and services [CW, May 28].

Soviet professionals attending the fair "don't know how to do business because they don't have hard currency, and everything is controlled by the government," said Daniel Hsu, project manager at Acer Technologies, Inc. One Soviet researcher agreed, saying that the brand of the computer was not as important as the cost.

Nonetheless, a substantial and untapped market awaits Western suppliers. The total Soviet demand for personal computers is expected to hit anywhere between 17 million and 30 million by 2000.

Yet, according to the USSR State Committee for Computer Engineering and Information Science, of the 1.1 million computers the country plans to produce in its 1985-1990 Five Year Plan, only about 350,000 currently exist. That number is expected to grow to no more than approximately 400,000 by the end of the year, compared with the 515,000 initially forecast.

The largest foreign exhibitor at PC World Forum is no stranger to the Soviet market. West Germany's Siemens AG has offered PCs on the Soviet market since 1989 and has sold electronics and telecommunications there for several decades.

Like Italy's Ing. C. Olivetti & Co., Siemens is targeting the Soviet educational market with its PCs. Given its financing difficulties, Siemens' three-year pact to supply this market with 300,000 PCs could take up to five years, said Hans Holger Moskopf, Siemens' manager for Central and Eastern Europe.

Siemens has already had orders canceled because of payment problems. Moskopf said the deal would not be expanded to include Intel Corp. 80386-based machines, even though export restrictions were relaxed in early June.

Olivetti said it plans to provide Soviet schools with machines from its UK-based subsidiary, Acorn. "The future PC market is in the educational sector; 90% of the company's current contracts come from the Soviet Ministry of Education," an Olivetti spokesman said.

However, he said he anticipates problems because of nonexistent distribution channels, currency problems and the lack of any legislation governing business deals. One solution — bartering, whether in coal, oil or bee poison — is so wrapped in red tape that the government must now give a go-ahead for all barter licenses.

Other exhibitors are focusing on a more modest strategy: France's SMT-Goupil recently introduced its seven-model G6 PC line, which ranges from an Intel 286-based computer running at 12.5 MHz to an I486 unit. It already markets 286 machines in the Soviet Union and will sell 386-based computers, a company spokesman said. He added that 5,000 to 6,000 PCs are scheduled to be delivered by June 1991.

However, an SMT-Goupil spokesman admitted that his company's PC prices will likely be undercut by other "modest" players on the Soviet market — notably Taiwan's Acer and South Korea's Goldstar Software Ltd.

Targeting the Soviet PC market with 8088-, 80286- and now 80386-based machines, Acer exhibited at the show primarily to emphasize awareness of its brand. "Our main competitors [in the USSR] are Taiwanese firms," Hsu said.

Goldstar, however, said it fears that in the long term, Soviet users will be unwilling to acquire hardware from Asian clone manufacturers that cannot ensure long-term maintenance and other services.

MICRO BITS

Televideo, USSR sign deal

Televideo has signed two joint venture agreements that will enable it to market its computers in the USSR. The first pact will provide computers to the **city of Moscow**, starting with 2,000 per month and eventually building up to 10,000 systems per month within two years. The second agreement will set up a computer retail chain that will enable the **Ministry of Construction** to resell computers and parts.

Ventura Software, Inc., a Xerox Corp. subsidiary, has announced a deal with **Sun Microsystems, Inc.** to produce a version of Ventura Publisher for the Sun Unix workstation environment that takes advantage of **AT&T**'s Open Look graphical user interface. The Open Look edition is slated for release in the second half of 1991.

Altos Computer Systems said it is offering a multiuser version of **The Santa Cruz Operation**'s Open Desktop graphical operating system. The Altos version is now available on its new Extended Industry Standard Architecture-based Intel Corp. I486 Multiuser System 5000 product family.

Intergraph Corp. recently announced that it will base the operating system for its workstations and servers on the **Open Software Foundation/1** operating system. Intergraph's initial release is scheduled for 1991. OSF/1's capabilities will also provide the foundation for Intergraph's plans for an enterprisewide distributed computing environment.

Novell, Inc. and **Hewlett-Packard Co.** said they will develop a version of HP's New Wave environment that can be shared by multiple users on Novell's Netware network operating system and will also extend New Wave's Object Management Facility to link objects across a Novell network. The two firms will work to provide an easy migration path for Netware's integration into the New Wave environment.

Adobe Systems, Inc. has signed agreements with **Xerox** and **Eastman Kodak Co.**, giving both companies licensing rights to Adobe's Postscript Language interpreter. Xerox said that it is developing products for the electronic printing and publishing market. Kodak will develop electronic imaging products that incorporate the Postscript interpreter.

Innovator

CONTINUED FROM PAGE 37

now seems the rule. Front-line innovators are not always the wild-eyed nutty professors with wire-whipped hair or kids with soldering irons in the garage. They are often professionals in the technological trenches who are looking to hone and maintain an edge. For them, the old methods simply don't work.

Thomas Hutchinson, a physicist at the University of Virginia in Charlottesville, began work on an eye-controlled IBM Personal Computer AT simply because "we have so little ability to communicate" with standard graphical user interfaces.

With the Eyegaze Response Interface Computer Aid in place during a word processing application, users can select and move paragraphs simply by looking at them instead of fumbling with clumsy DOS commands. The setup uses an IBM PC AT and about $3,000 worth of additional hardware, Hutchinson says.

The design offers several high-resolution squares set against a low-resolution background on a computer display. An infrared LED connected to a video camera mounted beneath the monitor beams a light into the user's eye, which then reflects off the back of the eye, triggering an effect called "bright eye."

The video camera records the light reflected off the retina, which moves as the user shifts his gaze, as well as light reflected off the cornea, which remains stationary. By measuring the distance between the two points of light, it is possible to determine where the user is focused. Users operate optical switches that control various devices by focusing their eyes on specially designed areas.

The information is then relayed to an analog-to-digital expansion board on the PC, which in turn triggers the software to carry out the command indicated by the square.

Some progressives push the technological envelope because of an innate joy in making things that are useful to others. "We are the patient's advocate, so we are always yelling for things that our patients couldn't ever imagine asking for," says Dr. Bruce Kall, a senior analyst at the Mayo Clinic in Rochester, Minn., which is also exploring work in artificial reality procedures.

Others bound into the future after languishing for a long period in the past. For years, agents at the William Morris Agency, Inc. talent agency used an interoffice system of Rolodexes and memos that had been around since the days when Bogey and Bacall were box office dynamite.

They now have an advanced system developed by Next, Inc. in which specially designed software enables them to view videos of the entertainers they represent. The setup has fundamentally changed the character of the office, says computer systems director Alex Henry. Workers now hold on-line staff meetings that are "open and wide-ranging discussions that can last for days, as opposed to just an hour-long exchange of small facts."

In the past, new technological procedures were normally reserved for upstart companies hoping to get a quick leg-up into the big leagues. "It's often easier to graft a new technology onto a new organization than mutate an existing organization to take advantage of a new technology," says Paul Saffo, research fellow at the Institute for the Future, a Menlo Park, Calif.-based consulting think tank.

> "THE ASSIMILATION of new technologies is going at a tremendously accelerated rate."
>
> PAUL SAFFO
> INSTITUTE FOR THE FUTURE

While that is changing — the Big Eight accounting firm of Peat Marwick Main & Co., for instance, was an early adapter of the Apple Computer, Inc. Macintosh technology to streamline office procedures — some types of firms are more likely than others to take new technological bait. Product-oriented companies tend to take more of a risk because they're serving an end customer, Saffo says.

New methods may also require an organization that can deal with controversy. Such was the case at The Discovery Channel, the rapidly growing cable network that needed to get the inside track on new quality programming before its competitors. "If we can say yes on a program before PBS or A&E or National Geographic, then we get that program," President Ruth Otte says.

In a typical year, the program coordinator looks at about 5,000 hours of programming but is only able to purchase and show about 1,000. When Otte moved into the struggling start-up network nearly three years ago, she helped devise an elaborate PC-based electronic-mail system that includes a function called "conversation management," which some of its detractors characterize as "fascist." The feature requires its users to state explicity what they're going to do, what they ask others to do and when they agree it will be accomplished.

Otte, however, does not see the system as fascist. "If we don't keep our promises to each other, we're not in business." The flip side, Otte says, is that the system encourages risk, trusts subordinates and allows for ownership of projects.

While some fear that the inherent risk in using pioneering PC technologies is still great, those on the front lines usually disagree. "We aren't using anything that hasn't been pretty well proven," says Martin Klaver, manager of operations analysis at Lenox, Inc., a china and crystal company in Pomona, N.J., that uses a voice recognition system developed by Newton, Mass.-based Dragon Systems, Inc.

Several employees use the voice recognition hardware, Dragon's Voice Scribe-1000, plugged into Compaq Computer Corp. Deskpro 286s and IBM PC XTs with Intel Corp. 80386 add-in cards. "The problems usually come in the development cycle. Maybe we're the first on the block to have this, but it doesn't mean [we're] the biggest risk takers."

Instead, those who sit languidly by while technology sprints past are the most likely losers. "The assimilation of new technologies is going at a tremendously accelerated rate," Saffo says. "The first pioneers in desktop publishing set forth only a few years ago because they wanted something new and different, but now people are getting into desktop publishing because they know they'd better do it or they'll go out of business."

The chief hurdle still to leap, however, is the fact that the computational foundation in many organizations has often been cast in concrete. Some new methods must fit into old molds. "There are an awful lot of people out there marrying new technologies with a hope, a prayer and a lot of enthusiasm, but the trick is balancing that with a way to accomplish the corporate mission," Saffo says.

Unfortunately, that is becoming increasingly more difficult because so many computational foundations have already been poured. "A lot depends on how wedded an organization is to a particular standard," says John Rizzo, vice-president of marketing at Mountain View, Calif.-based Momenta, Inc., which is developing a new pen-based PC system. "If a company has a proprietary approach, it's more of a challenge to find those people who are the zealots who will carry the torch internally and convince others why this technology is new and different and better."

Typically, those people are in a position to authorize the funding and have the power to allow their firm to sign off on new technology, Rizzo adds. They must also be ready to put their heads on the chopping block if the system fails — or be on their toes and quickly find their way out of a dead end.

"If you hit a dead end, you have to be prepared to find the one little thing that maybe you did right and can turn into another idea, and suddenly, away you go," Kall says. "That's what is so exciting."

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NEW DEALS

Pratt & Whitney, Sun strike deal

United Technologies Corp.'s **Pratt & Whitney** division has selected **Sun Microsystems, Inc.**'s Scalable Processor Architecture-based computers as the platform of choice for all of the aerospace firm's workstation and server needs. Under a three-year pact, Sun will supply hundreds of Unix workstations, servers and peripherals. A key selection requirement was the ability to run **McDonnell Douglas Corp.**'s Unigraphics software, which is Pratt & Whitney's preferred computer-aided design and manufacturing package.

The **U.S. Government Printing Office** has selected **Knowledge Access International, Inc.**'s Kaware Disk Publisher, encompassing the Text/Imaging and Fielded/Image disk publishing systems, for producing compact disc/read-only memory on behalf of federal agencies.

Automated Business Systems and Services, Inc. and **Compucom Systems, Inc.** said their joint venture has won a contract worth a potential $17 million to supply the **U.S. Department of Administrative Services** with microcomputers and related support.

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NOVELL

The Past, Present, and Future
of Network Computing.

IXL

CONTINUED FROM PAGE 37

chase habits. "If I knew your age and sex, I could tell you probably what you would spend in each of our store's 40 departments," said David Barnhart, chief of sales analysis.

For example, IXL studied the demographics of personnel stationed in West Germany and determined that they would spend much less than was predicted by a homegrown sales projection program. Consequently, the exchange was able to avoid wasting money constructing facilities that would go underutilized.

Previously, the exchange employed one person at a $30,000 salary to analyze the demographics statistically. A single analysis required two to three weeks to complete manually, while IXL gets the job done in two to three hours, Barnhart said. He runs the program on an Intel Corp. 80386-based IBM-compatible running Ashton-Tate Corp.'s Dbase 3.0.

Although he is happy with IXL, which he said is the first of its kind, Barnhart complained that the concept of the product is so unique that it is difficult to explain in the documentation. "The manual is not very clear as to how to control the parameters," he said. "They've got a gold mine here if they could explain to people what it does."

At Wisne Design, a division of Progressive Tool & Industries Co., estimators use IXL to provide more accurate and consistent job estimates to customers.

For example, the program will look at the historical costs of hole-boring machines and the number of holes it was expected to bore to come up with a probable cost for a similar new machine.

"You can't put a price on a hole, but the number of holes is a function of the complexity of the system and the overall cost of the machine," said David Jambor, manager of computer-aided engineering.

Time saver

IXL also takes less time than the manual method to complete an estimate. "It cuts a substantial fraction off our time to estimate," Jambor said. He runs the program on an IBM 386-compatible, with the raw data entered in a Lotus Development Corp. 1-2-3 spreadsheet.

Jambor agreed with Barnhart that the product concept is relatively unique and hard to grasp. "I think a person has to be mathematically-minded to appreciate what it is doing," he said.

He added that IXL is "very finicky" in the way it reads a database file. Unlike 1-2-3 and Dbase, IXL will not tolerate a blank space in a field name, he said. "That threw me for a loop because it's not in the manual."

The $490 program works on DOS, OS/2, Unix, Apple Computer, Inc.'s Macintosh and VMS operating platforms and supports most common database platforms. Databases can have an unlimited number of rows but only up to 64,000 columns.

Pastore

CONTINUED FROM PAGE 37

remark about the July heat and then introduced the experts.

A guy from DG started the ball rolling, saying DOS and other open standards are not what will drive PCs into the '90s. (DG, like a lot of old-guard mini vendors, is trying to milk its proprietary-system standards.)

Following this, an AST Research pitchman stood up and said multiprocessor PCs will drive the industry into the '90s. (AST is working on a multiprocessor PC.)

Then it was Apple's turn. The Apple rep spent a good deal of his alotted time predicting that Microsoft's Windows won't be the interface that powers the PC into the '90s. (Apple is burning up over this graphical interface, which is bringing Mac-appeal to IBM-style PCs.)

Finally, there came the substitute spokesman for the original spokesman who was scheduled to speak for Intel. He threw on his slides and launched into the inevitable rendition of Moore's Law. I've probably seen Moore and his Law trotted out by Intel six times in the last couple of years, and I still don't get it. The Law, handed down from an Intel founder, says that the number of transistors on a CPU chip doubles every two years, or something like that. This means that in the year 2000, we'll have single chips with umpteen million transistors.

Having learned that, I'm sure the information systems managers in the audience who were wondering why they needed a 486 PC slept better that night.

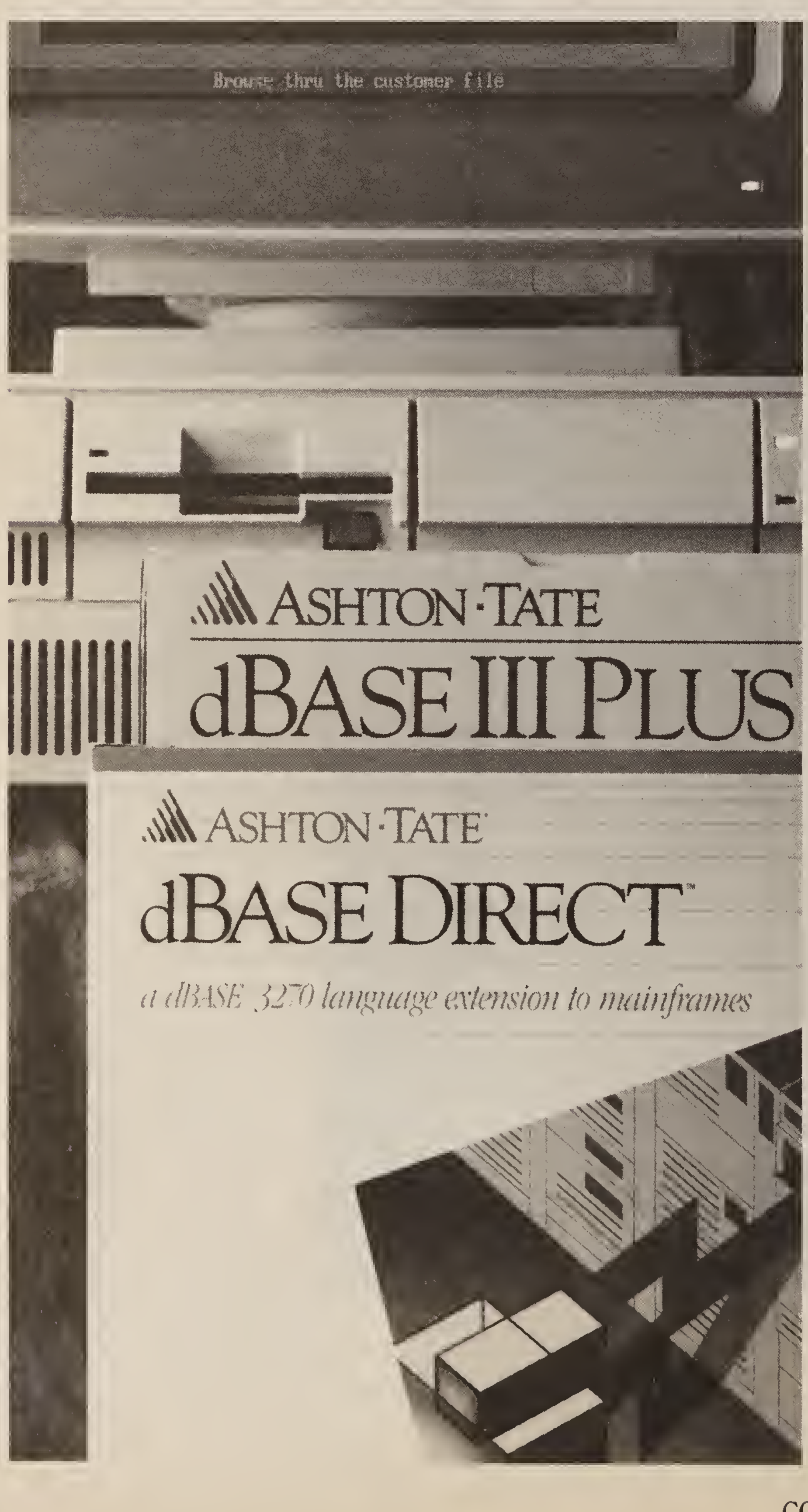
But these hucksters aren't the only letdowns at the conferences. The audiences rarely exercise their golden opportunity to put vendors on the spot. We don't hear many direct, tough questions like "Why should I buy a Micro Channel box over an EISA machine?" or "Why can't my Macs communicate more smoothly with my Compaq servers?"

Instead, we hear a few murmurs about esoteric techie concerns and the high price of laptops. Then everyone hustles out of the room with the zeal of sailors headed for shore leave after a year-long tour in the Bermuda Triangle.

As far as I can see, these conferences are only good for a chuckle — and that only if the slide projector impishly decides to chew up the presenter's slides and throw those meticulously memorized spiels into a state of chaos.

Pastore is a *Computerworld* senior writer.

The direct route to reducing 3270 backlog.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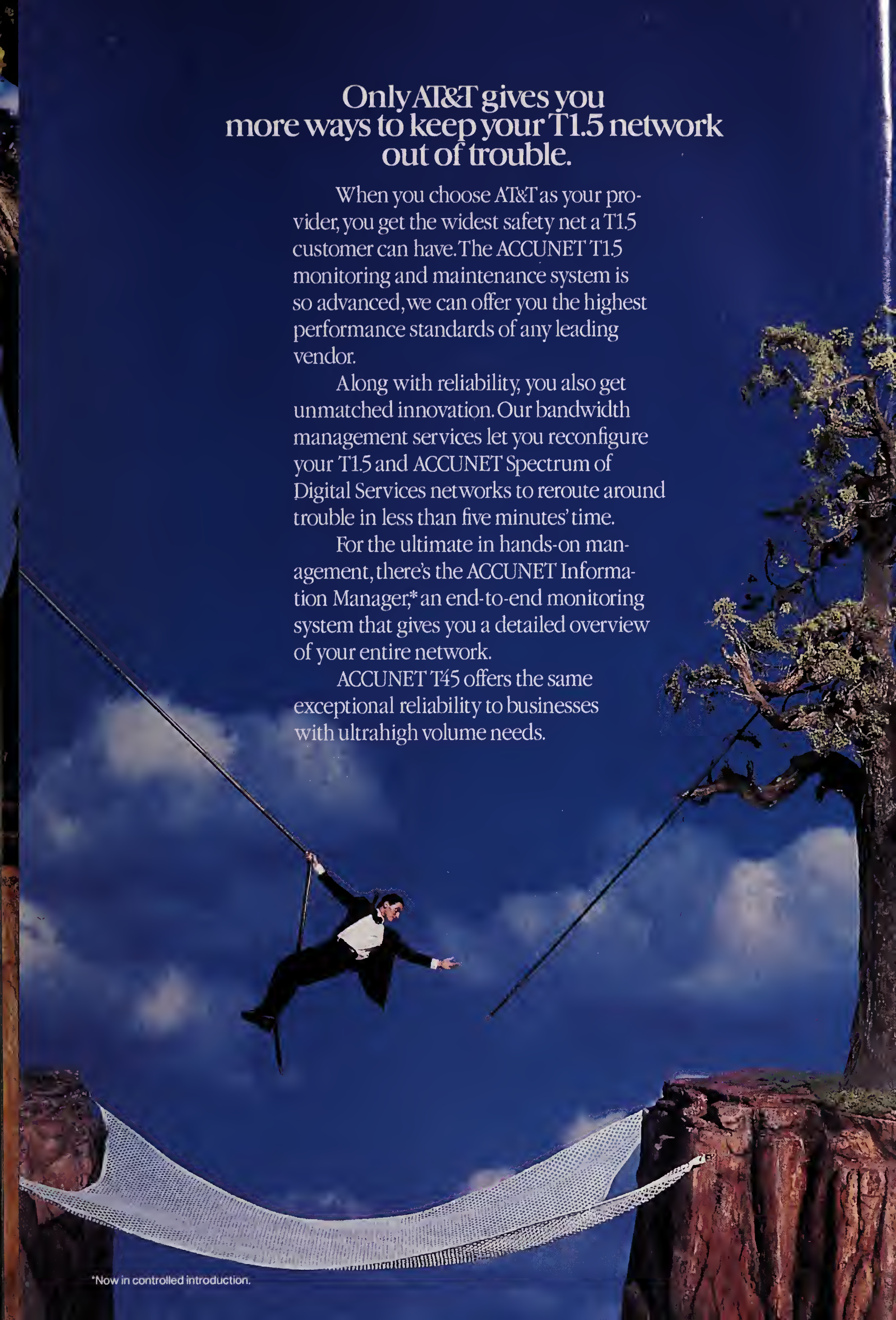

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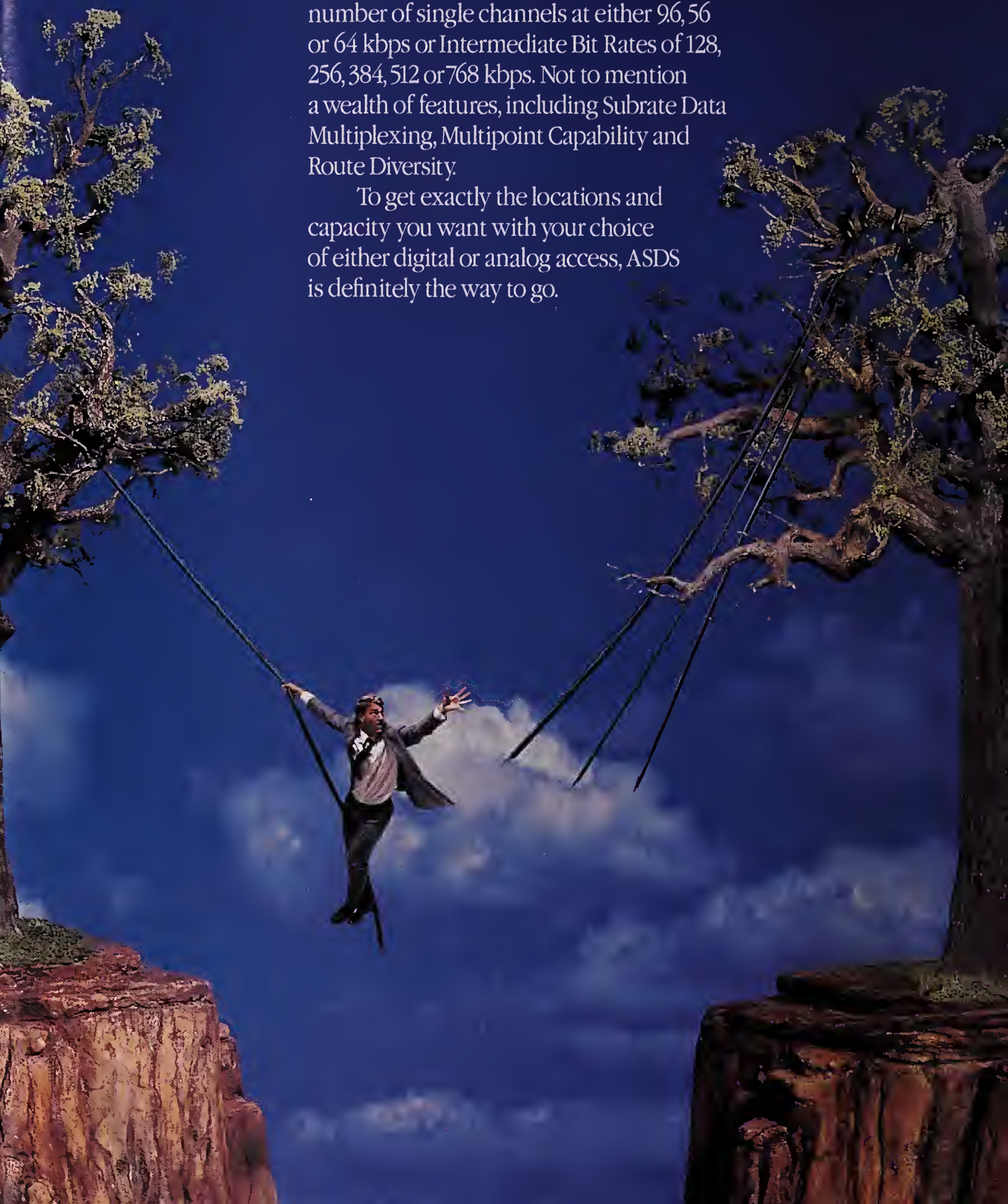

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- Due to a simplified rate structure and new added volume discounts, our ACCUNET Reserved Digital Service is now more affordable than ever.
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COMMENTARY

Ellis Booker

Sprint slows to a crawl

U.S. Sprint's long-distance customers did not abandon their carrier en masse last month after hearing of its $42 million loss in the second quarter.

Experienced telecommunications managers at large corporations have seen this sort of thing before. Some remembered, no doubt, a few years ago when MCI's viability was being questioned — when its robust founder Bill McGowan was recovering from heart transplant surgery, and its stock had slid to $6 per share.

Other telecom managers probably took the Sprint news in stride, patiently reminding their bosses that, for reasons ranging from the corporate policy against single-vendor relationships to the simple need for network redundancy, they hadn't used a sole provider of long distance for years.

But if the Sprint shortfall did not cause a cataclysm among its customers — who will likely stick by the carrier as long as its rates are competitive and its service quality acceptable — the company's second-quarter performance did cause a shiver to go through the regulatory machine that has been grinding forward ever since the Bell System was dismantled.

In the realpolitik of long-distance public policy, AT&T lost the most when Sprint reported its second quarter.

Since divestiture, AT&T has

Continued on page 48

Virus bill raises hopes, fears

Updated laws could hold unwitting transmitters liable for damages

BY GARY H. ANTHES
CW STAFF

WASHINGTON, D.C. — A panel of computer and legal experts at a congressional hearing praised the goals of a Senate bill that would modernize the Computer Fraud and Abuse Act of 1986 but raised troubling issues for owners and users of networked computers.

The bill extends the act's definition of computer "access" to include the intentional transmission or distribution of unauthorized software that damages computer data, software or hardware. Felony penalties could run as high as five years in prison and a $250,000 fine.

However, the bill goes further, saying that anyone who unknowingly but "recklessly" transmits destructive software could face a misdemeanor penalty of up to one year in jail and a fine of $5,000.

The new legislation would extend the reach of the earlier law beyond "federal interest computers" to include any computer used in interstate commerce or communications. It would also allow civil actions that could result in the payment of compensatory damages to people who suffer losses caused by computer abuse.

An official from the U.S. Department of Justice testified that the misdemeanor provision would give prosecutors added flexibility.

"[It] could be employed against computer hackers and persons responsible for computer viruses where the intent to damage a system or defraud can't be shown conclusively," Deputy Assistant Attorney General Mark Richard said.

But David Johnson, a partner at the Washington law firm Wilmer, Cutler & Pickering, said expansion of the law's scope and the provision for civil action would encourage lawsuits against blameless enterprises. He said that "large, deep-pocket institutions" that fail to scrub every disk and data transmission for the presence of a virus could become the targets of lawsuits.

"Regrettably, many institutions have failed to take even minimal precautionary measures because they are loath to interfere with computer users' prerogatives and because no crisis has brought the seriousness of the threat home to top policymakers in a concrete way," Johnson testified. He said these institutions are likely to be penalized unfairly when their systems inadvertently become "Typhoid Marys" during outbreaks of computer viruses.

"The reason for the recklessness provision is to make clear to computer users that they should not engage in experiments that place other users at risk," said Marc Rotenberg, director of the

Continued on page 47

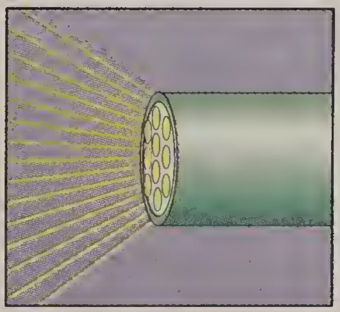
Southwestern self-healing net debuts

BY ELISABETH HORWITT
CW STAFF

ST. LOUIS — Following in the footsteps of US West, Southwestern Bell Telephone Co. has announced a fiber-based, high-speed digital network that promises customers long-term cost savings and guaranteed diverse routing for backup purposes.

Users of Southwestern Bell's Securenet will pay a premium for each 1.5M bit/sec. T1 or 45M bit/sec. T3 line they want "secured," or provided with a backup fiber-optic line that runs through a different Southwestern Bell central office from the primary line, according to Ed Wilkison, a Southwestern Bell spokesman.

Securenet will automatically reroute lines to the backup facilities, insuring customers against loss of service if the primary line were severed or if a fire or other disaster were to hit the primary central office, Southwestern Bell said. The service addresses a long-standing demand from major users that regional operating companies provide diverse routing and other reliability features on the local loop, according to John Saccente, a Houston consultant. "I think Southwestern Bell is trying to go up against would-be bypassers" among its major customers, as well as aggressive alternative access carriers such as Metropolitan Fiber Systems, which has already established itself in Houston, Saccente said. Such carriers specialize in high-speed, self-healing fiber-based networks for large companies concentrated in metropolitan areas.



Southwestern Bell has already cut its T1 rates in response to threats from Metropolitan Fiber and other alternative carriers, according to a telecommunications manager at a major oil company. He added that his company is discussing Securenet with Southwestern Bell, "although we're a long way from signing." The oil company set up its own private fiber and digital microwave network years ago to ensure local loop reliability, the telecommunications manager said: "We're more interested in pricing, and Southwestern Bell has talked in generalities so far."

Southwestern Bell has not yet determined prices but is targeting Securenet at between 25% and 30% over its existing T1 rates, Wilkison said. He added that the company has yet to determine the "crossover point," or minimum number of T1 lines that will enable a user to cost-justify the fiber-optic service. The service does require that a fiber-optic line be installed from the central office out to the user's premises.

Securenet is scheduled to become available in September in Houston and Dallas.

While the local carrier has been aggressively installing fiber in its major cities for several years now, Securenet represents Southwestern Bell's first attempt at leveraging the fiber's high bandwidth and reliability features in commercial services, Saccente said. Securenet will form the basis for other broadband network services such as Synchronous Optical Network, broadband Integrated Services Digital Network, and Switched Multimegabit Digital Service, Southwestern Bell said.

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Analysts rely on software package to mince distributed financial data

BY JOANIE M. WEXLER
CW STAFF

It slices! It dices!

A consolidated financial management and reporting package called Control from Kay Consulting International, Inc. in Los Angeles is allowing financial analysts in at least two large firms to chop, puree and blend corporate information in whatever combinations they choose.

The complex task of quickly accessing distributed information is getting even trickier for companies that must mix data stored on remote local-area networks running in multiple business units. Enter the latest version of Control, introduced in late 1989, which runs on a variety of LAN topologies and network operating systems.

William Schaefer, a senior financial analyst at Arco Transportation Co., moved from a small, stand-alone version of Control to the networked version shortly after it became available. He said he decided to install four token-ring LANs at his three corporate sites — each running Novell, Inc.'s Netware — because his mainframe applications were "no longer flexible enough to meet new requirements."

"In the new configuration, we have a system that is very easy to modify," Schaefer said. "We can add organizations and mix and match how we look at them. We're able to isolate detail levels down to different segments of the business."

Consolidated combinations

Control software, which is both a database and database manager, performs large-scale consolidation tasks from general-ledger data — a composite of financial data from various corporate departments and divisions. This allows users to view subsets of information in a variety of comparative and analytical combinations.

The package aids in budgeting functions; draws comparisons of actuals to plan; budgets and forecasts; and produces financial reports.

Schaefer explained that his group is responsible for "looking at the performance of a division and determining why it did or didn't make budget. Then we make projections for the rest of the year."

Arco's mainframe systems, which were developed about 10 years ago, would have required a major upgrade in order to adequately handle those tasks in today's environment, Schaefer said. He added that he expects to pay back the entire cost of the Control product in six to nine months. The savings will come from reduced mainframe use fees and related costs, he said.

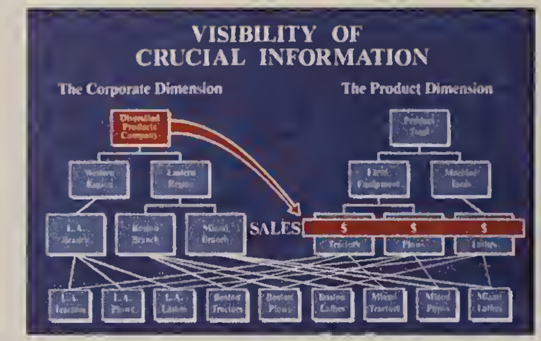
In Arco's mainframe-based environment, to recalculate a model took approximately 15 to 20 minutes, Schaefer said. To do the same calculation using Control, he said, takes under five seconds.

The network versions of Control start at $12,000 for Intel Corp. 80286-based networks and $16,500 for 80386-based networks, according to the vendor.

A major difference between Control and competing packages is that Control is an application package, said John Torell, manager of group financial systems in the space and communications group at Hughes Aircraft Co. in Los Angeles. Most others, he explained, arrive as fourth-generation programming languages with common accounting commands and functions that users must customize. Hughes has been using the mainframe version of Control for about four years.

Torell said Hughes was able to radically improve the timeliness of reports when it replaced four overhead control systems with the Control product.

"Data is now available on the sixth workday of the accounting close instead of the 19th," Torell explained. "It was important to improve that timeliness because otherwise the trail was cold; it was too late to act on the information."



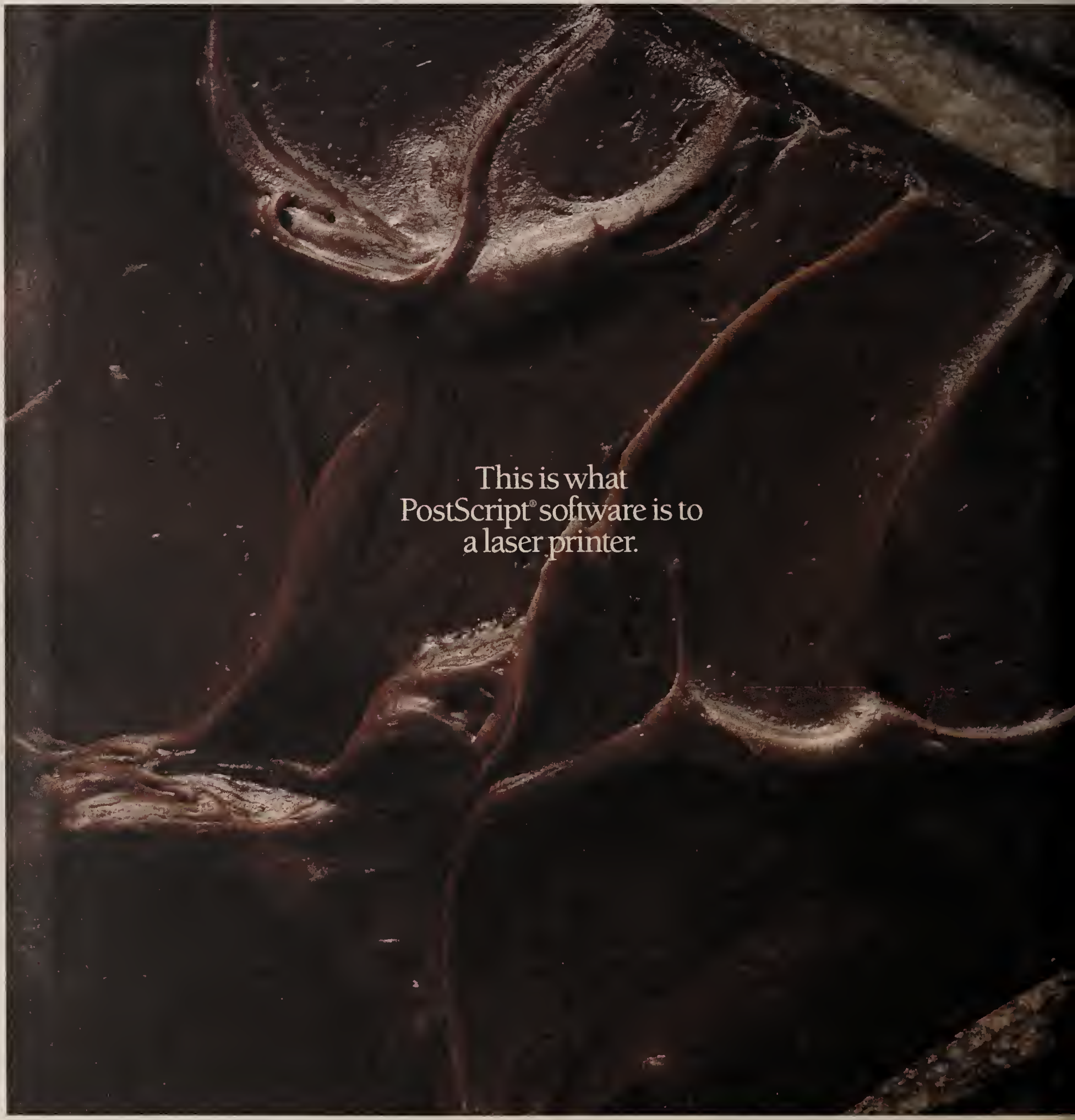
Control *functions as a networked database and a database manager*

Torell said that while Hughes saves "$100,000 per year in programming and computer costs alone," the main benefit of using the product has been improved morale at the company.

"We used to have analysts becoming clerks," Torell said. He explained that this was because analysts had to re-enter data from seven different sources using different spreadsheets. Control uses an intelligent mapping facility to convert any ASCII flat file into the Control database, saving analysts hours in rekeying time.

"Now our MBAs forecast overhead expenses much more accurately and don't have to spend large amounts of time inputting data. We've reduced a lot of overtime and had much less turnover."

Torell said 300 workers at Hughes use Control and that the package allows users to expand the system without doing any of their own programming.



Comdisco makes backup flexible

BY ELLIS BOOKER
CW STAFF

ROSEMONT, Ill. — Planning for disasters, an unpleasant but vital job, rests on a simple rule: Expect the unexpected.

With that in mind, Comdisco Disaster Recovery Services (CDRS), a $100 million subsidiary of leasing firm Comdisco, Inc., recently began migrating from dedicated to switched links between its centers, so as to give customers flexibility as to which of its disaster recovery facilities they can use in an emergency.

Two elements make up CDRS Net. Business recovery facilities, which include workstations and other business systems, are where users go to conduct business when the disaster hits. "Lights-out" computer recovery facilities contain the Comdisco hosts that take over processing when a customer's computers are taken out.

CDRS originally co-located business and computer recovery facilities in the same physical location. More recently, it located the two types of centers in different places and linked them with dedicated lines. In this next phase, CDRS has begun to implement a switched network that will allow users in any business recovery facility to access any computer recovery facility.

One of the first of CDRS' 2,100 customers to test the network was 20th Century Insurance in Woodland Hills, Calif. "We were a little concerned response time wouldn't be adequate," data security administrator Sam Armas said. However, the 8-hour test in February, which linked an IBM mainframe in San Ramon with a control center in Cypress, Calif., went off without a hitch.

"In the traditional method, you'd be at the same location as the CPU," Armas said, adding that running the host from a remote location "saves money because you don't have to relocate a lot of people." In addition, using a network adds a degree of redundancy to CDRS' service, ensuring that two nearby companies declaring a disaster on the same day need not share the same physical hot site, he said.

"We're sticking the [computer] console function into the user environment instead of sending an army of people to the CPU," said John W. Schladweiler, senior vice-president of business development at CDRS.

The next step in CDRS Net, due to be completed by July 1991, will involve integrating CDRS's Canadian and European centers into the network, Schladweiler said.

Because a "survivable" network is so essential to this approach, CDRS has three paths into each center, including a very small-aperture terminal (VSAT) for accessing a backup satellite network.

Long-distance access

The "blue sky" use for such a network, Schladweiler said, would be to distribute processing and storage even more — for example, connecting a CPU, data tapes and users located in three separate locations. Users can already remotely access the remote computer control center over dial-up lines.

That is exactly what Miami-based American Savings and Loan Association in Florida did in its test of the network in April, said contingency planning coordinator Robert Suarez.

"We didn't send people to the business recovery center [in Texas], where we'd normally have to go," Suarez said. "We sent our data tapes, and the CDRS staff loaded them."

Nor did Suarez's 50-person information systems staff go to their normally designated CDRS control center in Atlanta. Instead, they remained in Miami and accessed the Atlanta facility over dial-up phone lines using a single workstation.

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Virus

CONTINUED FROM PAGE 45

Washington, D.C., office of Computer Professionals for Social Responsibility (CPSR), which supports the provision. "The law should make clear to computer users that potentially dangerous experiments cannot be conducted in an environment that puts users at risk."

However, Rotenberg said CPSR opposes the provision that would extend the law's reach to all computers used in interstate commerce or communication. Rotenberg said it had not been shown that the existing law is inadequate.

He also said that expansion in scope invites violations of First Amendment and due process rights. Searches of computer systems are inevitably broader than physical searches and are more easily abused.

In addition, Rotenberg said that monitoring computer communications and bulletin boards should be subject to the same sorts of civil liberties safeguards as now apply to wiretapping.

Two U.S. House of Representatives bills, introduced 1½ years ago, would beef up the felony penalties for willful computer mischief but are currently locked in a jurisdictional dispute and are not likely to go anywhere, a Judiciary Committee staffer said.

Booker

CONTINUED FROM PAGE 45

waged a rhetorical battle on Capital Hill and at the Federal Communications Commission (FCC), asking for relief from the oversight that it said hinders its business. Paradoxically, until AT&T seems to falter, lawmakers will be reluctant to permit a change in the status quo. At the same time, cynics have suggested that AT&T today has little incentive to develop startling new services to take market share from its competitors, since this would incline policymakers to tighten AT&T's regulatory bonds.

Those opposing a freer AT&T can now point to a financially struggling Sprint and to MCI's announcement earlier this year that it plans to acquire Telecom USA as proof that the long-distance market is shrinking, not expanding.

The stiffening resolve of legislators was evident earlier this month, when a skeptical House telecommunications subcommittee asked FCC Chairman Alfred Sikes why the commission was bent on lifting AT&T's "dominant carrier" status. Sikes replied that he still views AT&T as the industry's dominant player, but he added that the FCC could still consider easing some regulations for services in which AT&T faces competition.

But we must also consider the possibility that regulations designed to protect consumers may have the opposite effect. Take the "price cap/price floor" regulation that AT&T now operates under. According to a recent report from Multinational Business Services, this scheme may actually be keeping prices artificially high, preventing a price war that would ultimately benefit consumers.

REGULATION designed to protect consumers may have the opposite effect.

Moreover, Sprint's woes should not be placed at the feet of a partially untethered AT&T, analysts said. "They are losing because of ineptitude," declared Frank Dzubeck, president of Washington, D.C.-based Communications Network Architects. Sprint's cost structures, he said, are out of whack: "[Service] costs them more than anyone else, but they still want to sell it for less."

The FCC and its chairman are walking on a political razor blade. Predictably, legislators can take easy shots, bellowing about "monolithic" AT&T. (Actually, FCC figures show that AT&T has a 67% market share overall, 46% to 52% for high-end services.) But Sikes' position that all policies are worthy of review is reasonable and should not be rejected because of a stumble at Sprint.

Booker is *Computerworld's* Chicago bureau chief.

BIT BLAST

Wollongong taps reseller

The Wollongong Group, Inc. said it intends to add **Vitek Systems Distribution** to its list of resellers of Wollongong Integrated Networking Solutions (WINS) and Pathway software. WINS is based on the Transmission Control Protocol/Internet Protocol and Open Systems Interconnect protocols to provide microcomputer-to-mainframe integration. Pathway software integrates desktop computers into a companywide network. The vendor also said it has signed a distribution agreement with Philips Information Systems in Apeldoorn, Netherlands, for integrating selected WINS products into the semiconductor manufacturer's computers for international distribution.

About 8% of **AT&T**'s business customers would reportedly be affected by a proposed 2% rate increase for the carrier's Software-Defined Network, Megacom WATS and Pro WATS offerings. The carrier said the proposed increase reflects its network investment and inflation costs.

Siemens Communications Systems, Inc. said it will participate in a public metropolitan-area network field trial with **Bell of Pennsylvania, QPSX Communications Ltd.** and **Temple University** to provide engineering and logistical support to QPSX throughout the trial, slated for sometime this summer.

Chip maker **Advanced Micro Devices, Inc.**'s Advanced Networking Test Center for Fiber Distributed Data Interface interoperability announced results of its first multivendor test involving nine vendors' products. The company said that the test revealed that different implementations of Station Management 6.1 — the standard for managing the fiber local-area network at the physical layer — were interoperable and that 6.1 can be backward-compatible with Version 5.1.

Shiva Corp. is offering a deal throughout this month allowing owners of a Fastpath 1, 2 or 3 gateway or Cayman Gatorbox to trade in their units and purchase a Fastpath 4 for $999 (regularly $2,795). The gateways link Ethernet and **Apple Computer, Inc.** Localtalk networks, and Fastpath 4 supports both thick and thin Ethernet cabling.

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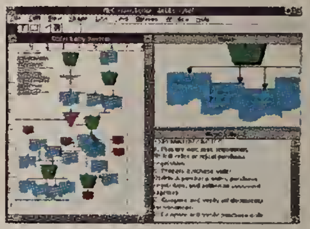

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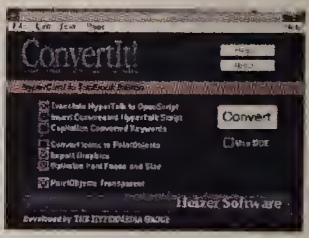

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NEW PRODUCTS

Local-area networking hardware

Hewlett-Packard Co. has announced the HP 18226A International Standards Organization (ISO) protocol interpreter for the HP 4972A local-area network protocol analyzer.

The interpreter monitors and displays ISO protocol headers in descriptive formats that enable LAN managers to analyze the network's ISO protocol operation and isolate problems.

The product can also decode several types of protocols through the Session layer of the Open Systems Interconnect model, the vendor said. The 18226A is priced at $960; the 4972A sells for $18,540.

HP
3000 Hanover St.
Palo Alto, Calif. 94304
(800) 752-0900

Local-area networking software

Unipress Software, Inc. has announced Macnix, an Apple Computer, Inc. Macintosh software package that enables users to access Unix-based systems in a Macintosh-style graphical user environment.

The product was designed to be used with serial or Ethernet connections. It enables users to simultaneously access Unix operating systems and Unix applications. It can emulate Digital Equipment Corp. VT100 and VT220 terminals and permits Macintosh systems to communicate with Unix hosts over dial-up and local RS-232 lines at speeds up to 19.2K bit/sec.

Pricing begins at $800.

Unipress
2025 Lincoln Highway
Edison, N.J. 08817
(201) 985-8000

Viewstar Corp. has announced the Entry Level System, a document image processing software package designed to run on Novell, Inc. networks.

The product includes software modules for capturing, storing, retrieving, managing, processing and outputting document images; two 19-in. monitors; and an optical disc storage unit.

The Entry Level System is priced at $130,000 or $97,500 without hardware.

Viewstar
5820 Shellmound St.
Emeryville, Calif. 94608
(415) 841-8565

Omni Solutions, Inc. has announced a file system designed to enable users to move large files in the Sun Microsystems, Inc. Network File Systems (NFS) client/server environment.

The Omni File System connects to a standard interface in the Sun operating system. It is compatible with NFS and completely transparent to NFS client workstations. The system can be used on file systems where files containing more than 96K bytes of data predominate.

The product lists at $9,950.

Omni Solutions
381 E. Evelyn Ave.
Mountain View, Calif. 94041
(415) 966-1024

Network services

BT Tymnet, Inc. has announced a family of bundled, port-based synchronous X.25 services that provides users with X.25 host access to a Tymnet network.

Xlinks Express includes leased-line private access port services for X.25 interfaces at speeds up to 19.2K bit/sec.

Xlinks provides users with all elements needed for an X.25 host-to-Tymnet connection for $900 per month.

BT Tymnet
2560 N. First St.
San Jose, Calif. 95161
(408) 922-0250

Front ends, multiplexers

Racal-Vadic has introduced two series of multiplexers that allow for up to 32 synchronous or asynchronous data channels.

The Racal-Vadic 7500 and 7600 series of multiplexers provide network consolidation by integrating voice, facsimile and data on digital links in multivendor environments.

Pricing ranges from $1,495 to $6,770 for the 7500 series and $1,790 to $2,385 for the 7600 series, depending on number of channels available.

Racal-Vadic
1708 McCarthy Blvd.
Milpitas, Calif. 95035
(408) 432-8008

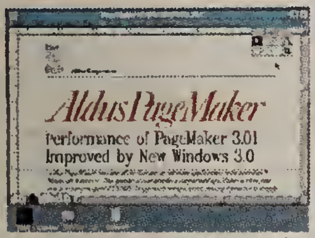
T3plus Networking, Inc. has announced a 45M bit/sec. T3 data service unit designed to provide T3 channel access for network elements that require wide bandwidth.

The DSU45 enables geographically dispersed computers, peripherals and high-speed local-area networks to be interconnected via standard T3 lines. The product provides framing, electrical interfaces and rate conversions necessary to link high-speed data terminal equipment with private or public T3 services.

A standard configuration is priced at $12,500.

T3plus Networking
2840 San Tomas Expy.
Santa Clara, Calif. 95051
(408) 727-4545

On How To Fully
Windows Version 3.0.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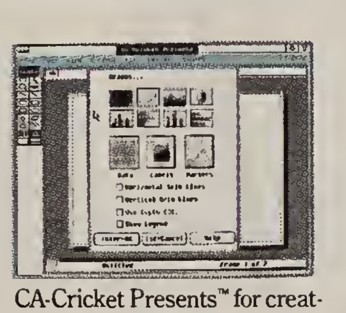
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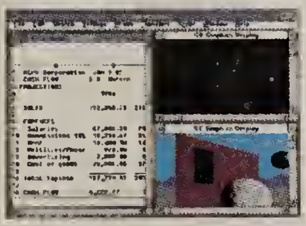
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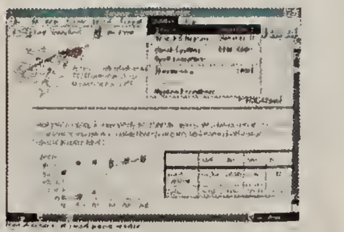
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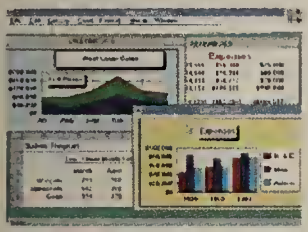
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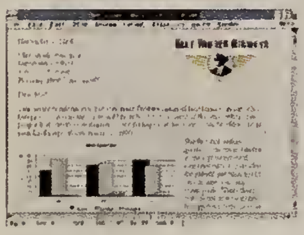
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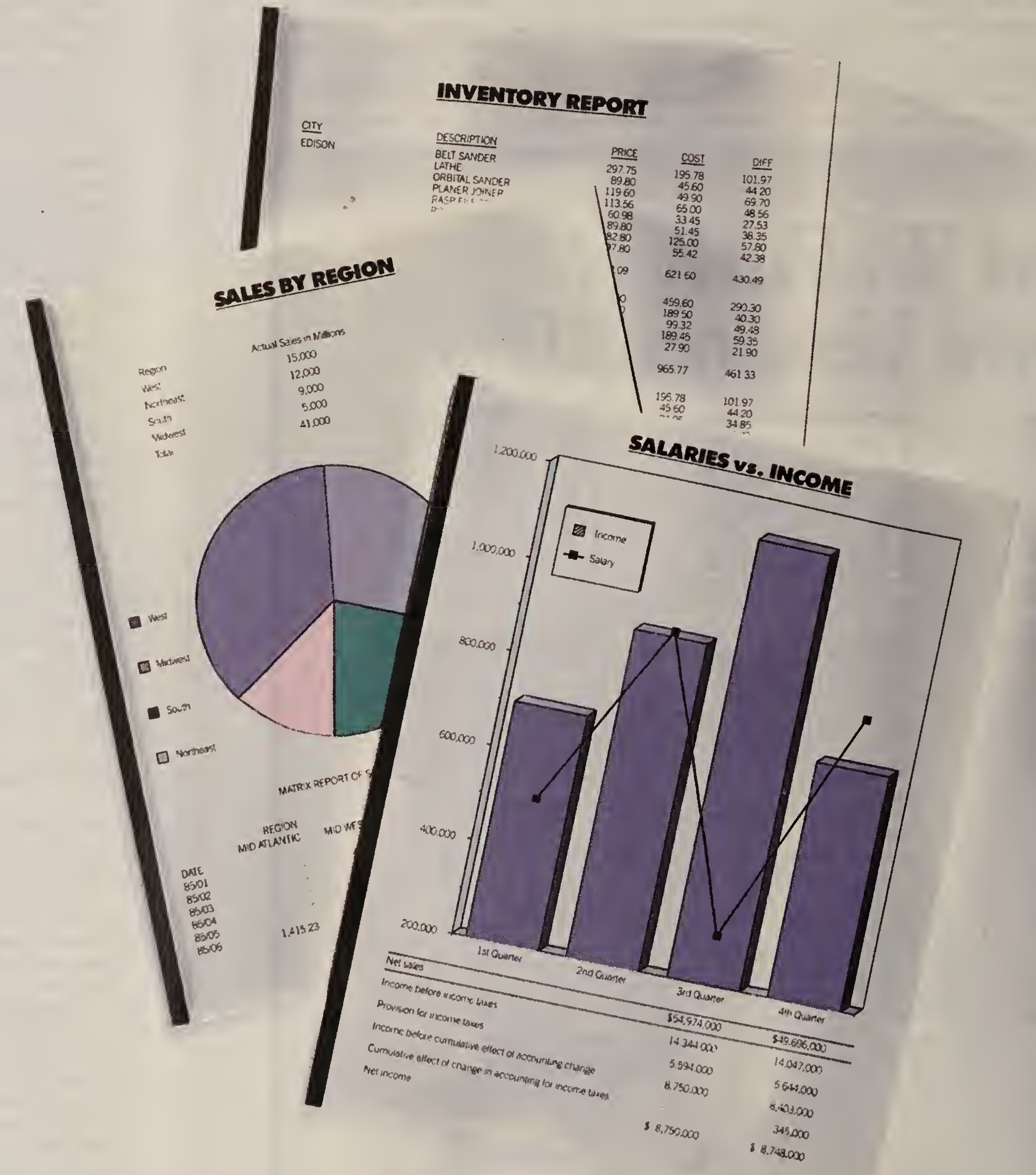

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MANAGER'S JOURNAL

EXECUTIVE TRACK

James R. Kinney has been named vice-president and chief information officer at **Carlson Companies, Inc.** in Minneapolis.

Kinney, 51, had been vice-president of information management at General Foods-USA in White Plains, N.Y. He spent 11 years at General Foods, rising from manager to vice-president.

Prior to that, Kinney was a management consultant at Northwest Industries and at Cresap, both in Chicago. He also spent six years at IBM.

Kinney holds a bachelor's degree in naval engineering from the U.S. Naval Academy and a master's degree in marketing from Northwestern University.

He is a member of the board of directors of the Society for Information Management.

……

D. P. "Pat" Payne has been named senior vice-president of strategic planning, sales and marketing, information systems and quality programs at **Waste Management, Inc.** in Oak Brook, Ill.

Payne, 47, had been with IBM since 1969. He started as administrative assistant to the chairman of the board and worked his way up to the senior executive position for the Midwest region, a post he had held since 1987.

Payne holds a bachelor's degree in business administration from Texas A&M University.

……

Edward Fischer has been appointed manager of microsystems support at Chicago-based **Tribune Broadcasting Co.**

Fischer was promoted from director of business affairs for Tribune's Independent Network News in New York, where he will continue to be based.

Before joining Tribune, Fischer was a financial manager at CBS News. He holds a bachelor's degree from Carnegie Mellon University and an MBA from the University of Pennsylvania's Wharton School.

Clear VISTAs for Continental Bank

CIO Gigerich is serious about building a new IS architecture to match bank's new mission

BY MICHAEL FITZGERALD
CW STAFF

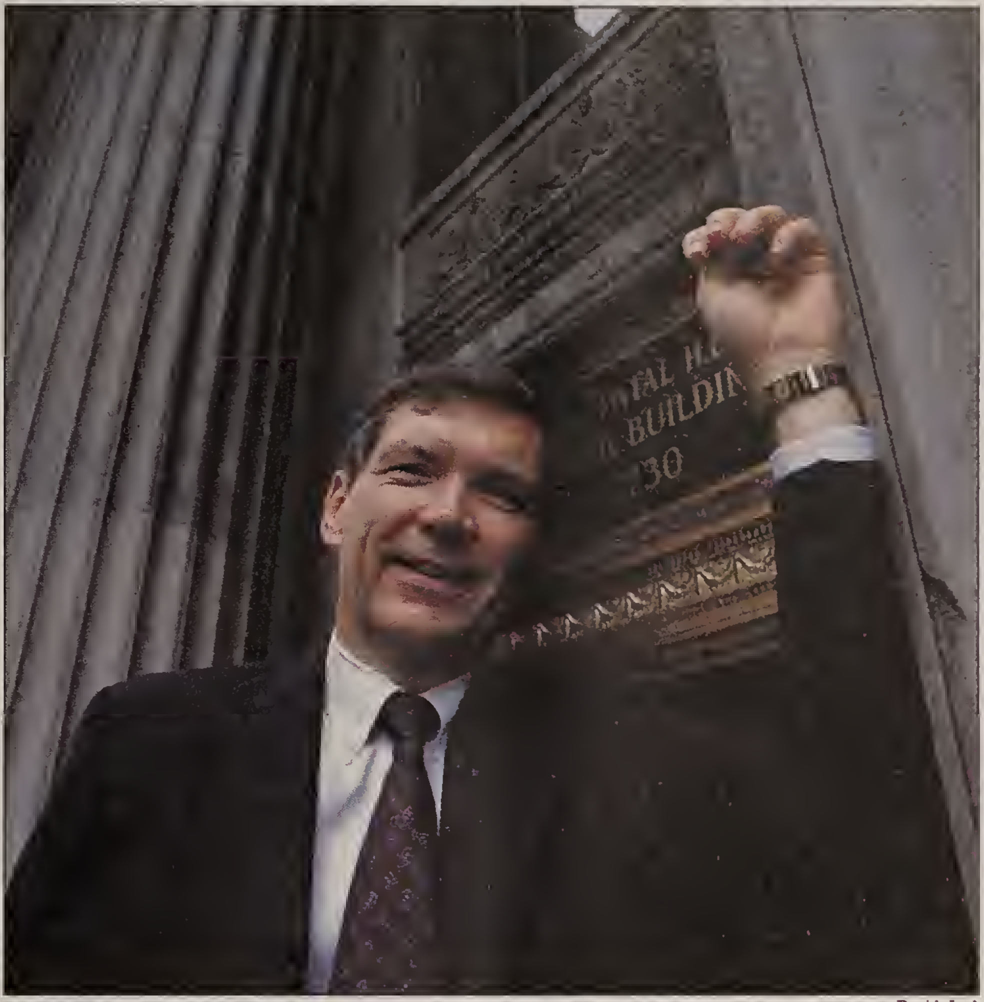
John Gigerich is a man who unquestionably has his ducks in a row. In fact, he has them in five rows, 26 ducks in all, with a California Raisin or three thrown in for good measure.

Gigerich, chief information officer at Continental Bank Corp. in Chicago, has marked the completion of various projects throughout his career with small Donald Duck figures in various poses, each signifying some major aspect of the project. Gigerich collects them because "you've got to keep a sense of humor about it and not take this stuff too seriously," he says.

But Gigerich is dead serious about radically reshaping the way Continental does business, and he has the mandate of Chairman Thomas Theobald to implement his plan for VISTA, or Vision for Information Systems Technology Architecture.

VISTA is just that: a broad, sweeping change that will affect the way Continental does business for years to come, if implemented successfully. Other banks have made plans for similar projects but failed to bring the job to fruition. Those who know Gigerich give him at least even odds to make it happen.

"Most banks have big plans and back off, and John has actually been able to stick with it," says Stewart A. Richards, director of the business architecture practice at Nolan Norton & Co., a Lexington, Mass.-based information systems consultancy that has worked with Continental. "Whether John is going to be the first to break the sound barrier, I don't know, but I think they have a good chance to do it."



David Joel

Continental's Gigerich *gets good odds on succeeding with his IS plans*

For the bank, it's a shift in image and style from a full-service bank that competed for both retail and commercial customers to one that concentrates solely on corporations, institutional investors and high-income individuals. For IS, this means a change from a mainframe-based, transaction-processing organization to one in which information is processed primarily through workstations.

Gigerich joined Continental in January 1988 to make the IS shift. Formerly chief administrative officer with IS responsibilities at First Bank Systems, Inc. in Minneapolis, Gigerich had turned down a Continental job offer in 1985, after the Federal Deposit Insurance Corp. had rescued what was then Continental Illinois Bank and Trust Co. from the brink of bankruptcy. The FDIC had intervened in 1984, when the hard-driving, loose-dealing reign of former Continental Chairman Roger E. Anderson was disintegrating.

"In effect, what we're trying to do is take a conventional commercial bank that went through a nightmarish expe-

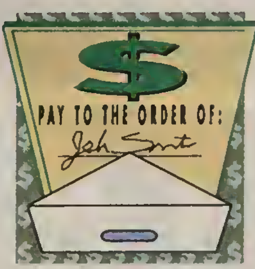
Continued on page 57

Programmers find more in vendor paychecks

BY CLINTON WILDER
CW STAFF

Vendors of software and services pay their programmers and analysts more than user companies do — and give bigger raises. But if you're a telecommunications specialist, you are probably better off working on the user side.

Those are conclusions of two employee compensation surveys completed by New York-based actuarial firm William M. Mercer, Inc. Mercer surveyed 12 programmer/analyst job categories in 110 vendors that belong to the trade association Adapso, then compared their total compensation with that of similar positions in information systems departments of more than 1,300 "general industry" firms.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PAY TO THE ORDER OF:

In the 12 job categories, the average vendor-paid salary of $36,100 was 2.4% higher than the $35,200 found in user companies. Mercer surveyed associate, intermediate and senior programmer/analysts in four areas: operating systems, software development, telecommunications and applications. The software development category referred to actual product development and was not included for user companies.

Furthermore, salaries will increase at a higher rate for vendor-employed IS professionals, the results said. At executive, supervisor and programmer levels, those working for software and services firms received raises between 5.9% and 6.2% in 1989, while raises for those in general industry were 5.3% to 5.8%. Mercer found similar results for increases budgeted for this year and projected for 1991.

"The services firms tend to lead the market in those types of positions because they're dedicated to that business," said Mary Lowe, Mercer's project manager for the survey.

In two out of three telecommunications categories, however, the tables are turned. The average senior programmer/analyst in telecommunications in a user's IS department earns $47,600, compared to $43,800 at a services vendor. An associate programmer/analyst at the user company averages $29,300, compared with $28,500 at a vendor.

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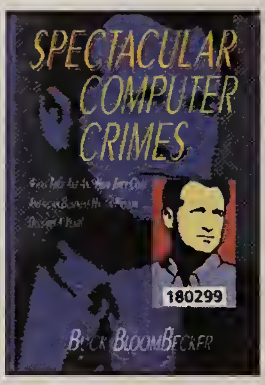
BOOK REVIEW

Not-so-spectacular computer crimes by not-so-surely criminals

SPECTACULAR COMPUTER CRIMES
By Buck BloomBecker
Dow Jones-Irwin, $22.95

I picked up *Spectacular Computer Crimes* with considerable enthusiasm because its author, Buck BloomBecker, is considered to be one of the country's top experts on computer crime. I was certain that it would be informative — even fun — to read.

BloomBecker is the director of the National Center for Computer Crime Data (NCCCD). His research on the magnitude and nature of computer crimes has been especially valuable to me, and I have referred to his findings in several articles that I have written for *Computerworld.*



Despite its name, *Spectacular Computer Crimes* is far from spectacular. This recounting of computer-related crimes does not go much beyond reporting information that has already appeared in dozens of newspaper articles over the past several years. Some of the cases in the book are arguably not even computer crimes.

There is one case about Katya Komisaruk, whom BloomBecker dubs "The Princess of Computing," a young woman who trashed an IBM 3031 mainframe at Vandenberg Air Force Base with a crowbar. Yet another case attempts to make a computer criminal out of Oliver North on the basis that the Marine lieutenant colonel used electronic mail in carrying out the acts he was ultimately found guilty of committing.

That is not to say that the crimes related in the book are not intriguing — certainly readers who know little about computer crimes will find most of these cases fascinating. Unfortunately, these same readers will also find too much irrelevant autobiographical material and personal observation mixed in with the crimes.

This is one of those books that seems to have been written while the author stood on a soapbox. BloomBecker is consistently preachy and at times places too much importance on his views on computer crime. For example, after telling readers that this book is a "gift," he adds: "I wish that you could have benefits like those I've experienced in my 10 years of involvement studying the social implications of computing."

He takes several potshots at Donn Parker, a computer security consultant at SRI International and a rival of sorts. The two have aired their differing views on computer crimes at considerable length at industry events in recent years.

For example, early in the book BloomBecker details Parker's stereotype of a computer criminal as someone who is "usually bright, eager, highly motivated," and then labels the depiction as "at best a historical relic and at worst an invitation to ignore the realities that confront us in the war against computer crime." Yet later in the book he bolsters his views with Parker's when it is convenient.

In BloomBecker's defense, Parker has repeatedly scoffed at the data generated by the NCCCD, particularly BloomBecker's estimate that computer crime costs $500 million per year. Parker maintains that because so few crimes are reported, it is thus impossible to accurately calculate the magnitude of the problem. That BloomBecker wants to return the potshots is understandable, but this sort of caterwauling is absurd in the context of this book.

Even more bothersome is that BloomBecker says his center has spent considerable time studying the makeup and motivations of computer criminals, yet he adds little insight to that body of knowledge. He defines computer crime by saying what it is not and then reluctantly hands out a definition that some readers will find overly broad. BloomBecker's position is that anything related to a computer that is either the target or instrument of a crime should be categorized as a computer crime. Thus he would consider, for example, the theft of blank floppy disks or electronic components or the physical destruction of computer hardware as computer crimes.

He places the motivations of computer crooks in such categories as "the playpen," "cookie jar" and "land of opportunity" and concludes that these categories are not exhaustive or chiseled in stone. He then encourages readers to write to him, particularly those who feel that he has missed a "signficant attitude." Just who is the expert here anyway?

At other times, BloomBecker snipes at the media for sensationalizing the problem of computer crime, and undoubtedly that is a valid complaint. But to tag one's book "spectacular" seems to be a case of engaging in the same sort of hyperbole he condemns.

Had BloomBecker stuck to what seemed to be the original premise — that is, to relate stories of computer crimes in an entertaining fashion — this book might have lived up to its title.

MICHAEL ALEXANDER

Alexander is *Computerworld's* senior editor, advanced technology.

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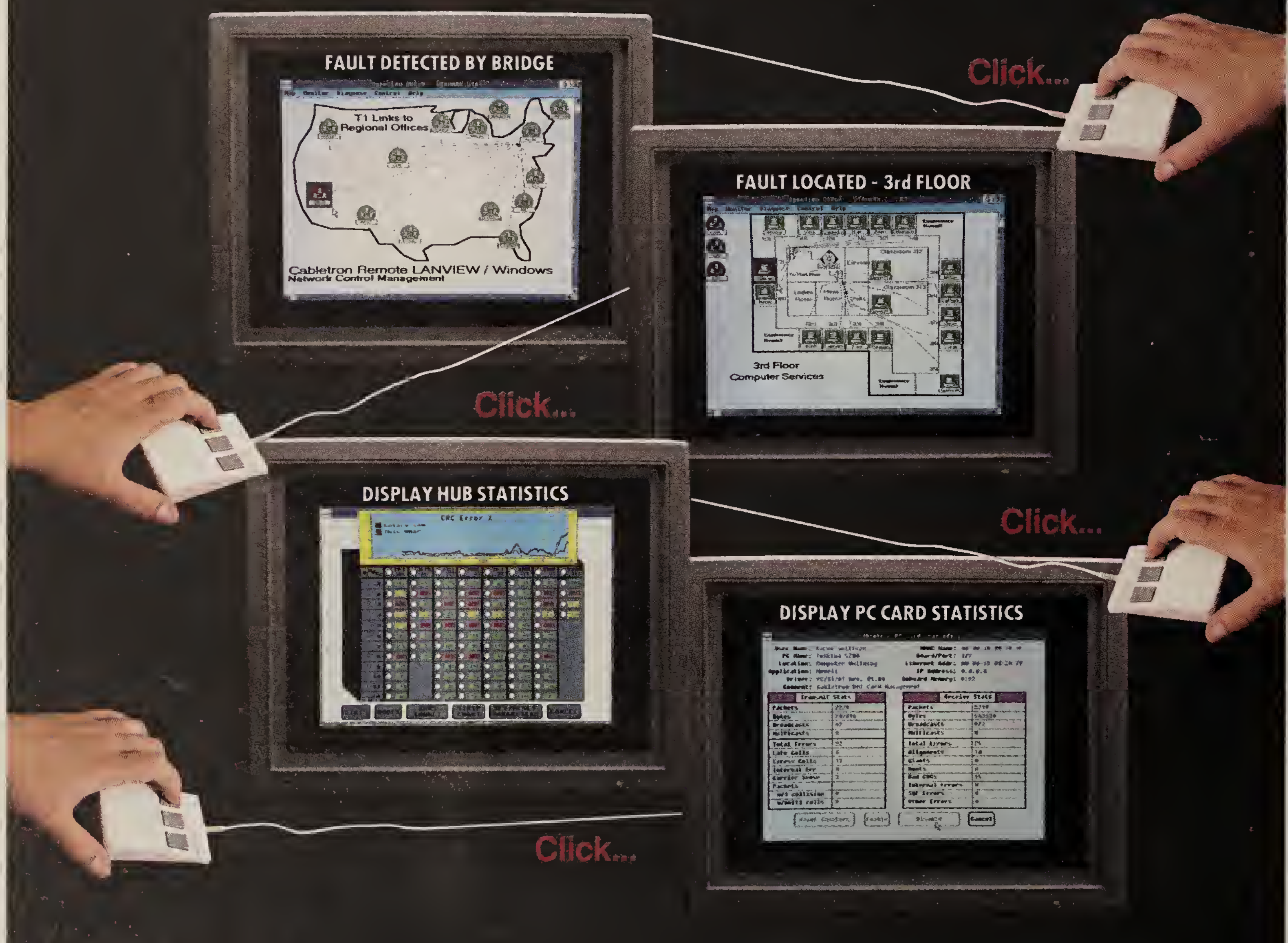
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COMMENTARY

Thornton A. May

Following Galileo's lead

Information systems executives who are seeking to introduce imaging technology into their organizations may be surprised to learn that the challenges they face are very similar to those that faced the astronomer Galileo as he championed a new worldview in the 17th century.

Early in his career, Galileo recognized that reality as interpreted by authority figures (for example, the church, the board of directors, vendor sales literature or senior management) was frequently at wide variance with the reality observed. Galileo came to this conclusion not because he was a free thinker and something of a belligerent — which he was — but because the telescope that he pointed to the heavens provided an entirely new data set that seemed to disprove official doctrines regarding the cosmos.

In a very similar manner, imaging provides IS executives with an entirely new set of data to chew on. The implications of this expanded data set seem to disprove, or at least call into serious question, the official doctrines regarding how systems should be planned, built and managed. Many of the traditional procedures for planning and building systems are not relevant in an image-enabled environment.

For example, the managerial ballet associated with generating a "yes" decision on introducing imaging technology — even on a limited departmental basis of eight to 10 workstations for less than $1 million — can take anywhere from 18 to 23 months. This is just the approval process; nothing has even been built yet.

With imaging, the process whereby new technology enters the organization must be fundamentally rethought. The business community is demanding just such a rethinking. This rethinking must reflect the sad reality that in a rapidly changing world, vendors are no longer able to write manuals fast enough regarding what constitutes effective technology management. There is no one to copy anymore.

With regards to imaging technology, the state of the art exists in the user environment, not in the vendor lab — and certainly not in the vendor's support literature. Technology managers are going to have to discover their own realities based on empirical experimentation with emerging technologies. For many, this is a frightening thought.

While many of young Galileo's contemporaries at the University of Pisa continued to devour the dated texts and teachings of Aristotle, he based his emerging knowledge on trial-and-error observation. This represented a new paradigm — one that involved creating his own truth — observing and measuring what he saw.

We are seeing a similar distribution of behaviors among IS executives. Some executives continue their lemming-like adherence to vendor-created nostrums, but a growing minority are seeking to get in front of the power curve by creating their own knowledge base grounded on firm specific experience.

> GALILEO UNDERSTOOD THAT having the right message was meaningless unless he also had the right audience.

Galileo was enough of a realist to recognize that being "right" technically wasn't enough. He understood that the princes of the day were not lying awake at night worrying about what celestial body revolved around another. They had practical considerations to deal with, such as how to keep the peasants from revolting. Similarly, do you think the chairman of your organization really cares whether you code in C++ or Cobol?

Our Renaissance change agent also orchestrated a multiyear publicity strategy that would be the envy of any publicist on Hollywood Boulevard. Galileo's understanding of court intrigue led him to present a persona to patrons that significantly differentiated him from other Italian mathematicians of the age. He was not a propeller head. He positioned himself as a Florentine patrician, with superb Latin and Florentine language skills. He was not pedantic. He not only spoke multiple languages, he spoke the tribal dialects internal to those languages as well.

Galileo recognized that by publishing a pamphlet announcing a telescopic universe of infinite space, he was antagonizing a powerful societal element — the church. A business unit moving forward with a non-IS sponsored imaging initiative can be expected to come under some hostile scrutiny as well. Galileo handled the political dilemma astutely.

First and foremost, he allied himself with the senior line manager of the day by naming the newly discovered moons of Jupiter the "Medicean planets" after the family of Duke Cosimo II de Medici of Florence. He also sent the grand duke a telescope with which he could view his namesake moons.

Galileo also initiated a dialogue with the church powers-that-be to convince them that their worldview might need some minor recalibration, but here he failed. The clergy was very reluctant to look through the telescope to view the data that might convince them. Contemporary technologists face the same dilemma. Even when one has the facts, rational behavior does not necessarily follow in others.

The Medici rewarded Galileo's discoveries not because of their technological usefulness or scientific importance but because of their political impact. The political handlers of the Medici regime saw in Galileo's new worldview something they could use.

A rule of thumb in court society was that one's status was determined less by one's discipline than by the prince's favor. By enabling the realization of the prince's objectives, Galileo ensured a flow of research dollars. It may have bothered him that his science was periodically cheapened to provide spectacles and exotic marvels to the hoi polloi. But it did not bother him that the funding stream had become an annuity.

Organizations moving forward with imaging technology must place the technology in a context of maximum business impact. Placing the executive dining room menus on optical disc is not going to buy you much mind share in the boardroom. The initial business application of imaging technology has to be real — frighteningly real.

Galileo understood that success and effectiveness depended on placing his arguments in a context conducive to acceptance. He understood that having the right message was meaningless unless he also had the right audience.

Galileo is most famous for his contributions to our understanding of the celestial world. But when we read between the lines, we find that he also had a unique and sophisticated appreciation of how the terrestrial world functions. We might go so far as to say that Galileo would have made a heck of a chief information officer.

May is director of imaging research at the Nolan Norton Institute, a research branch of IS consultancy Nolan, Norton & Co. in Lexington, Mass.

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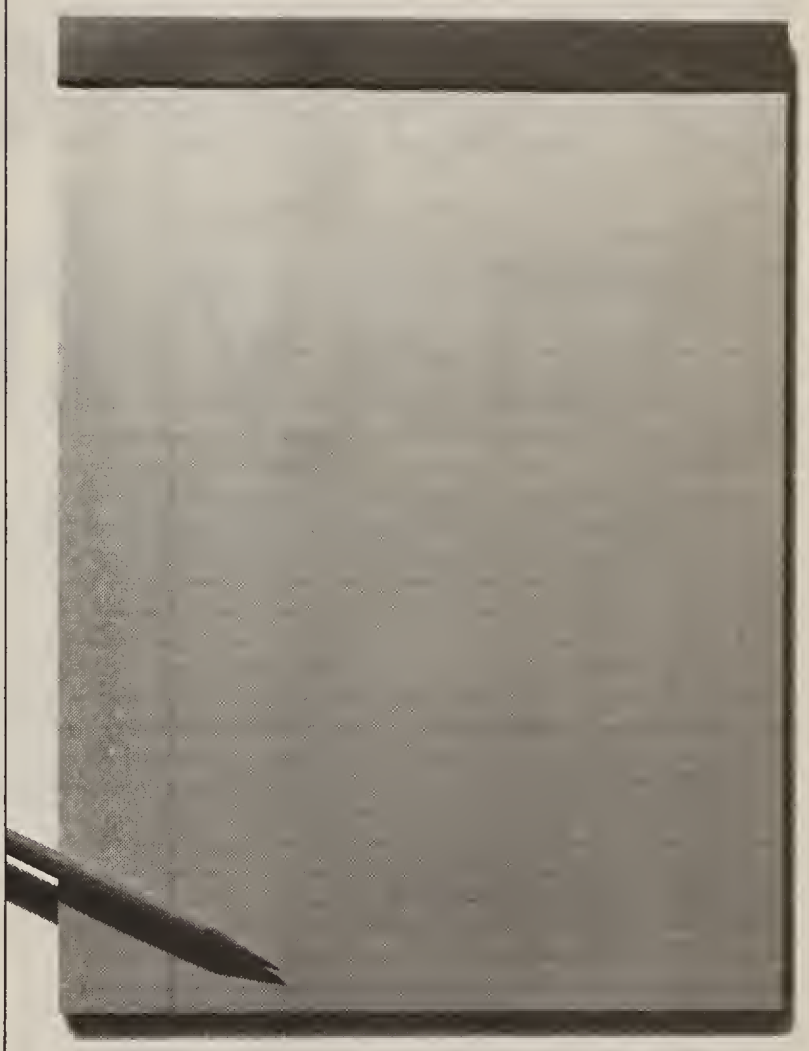

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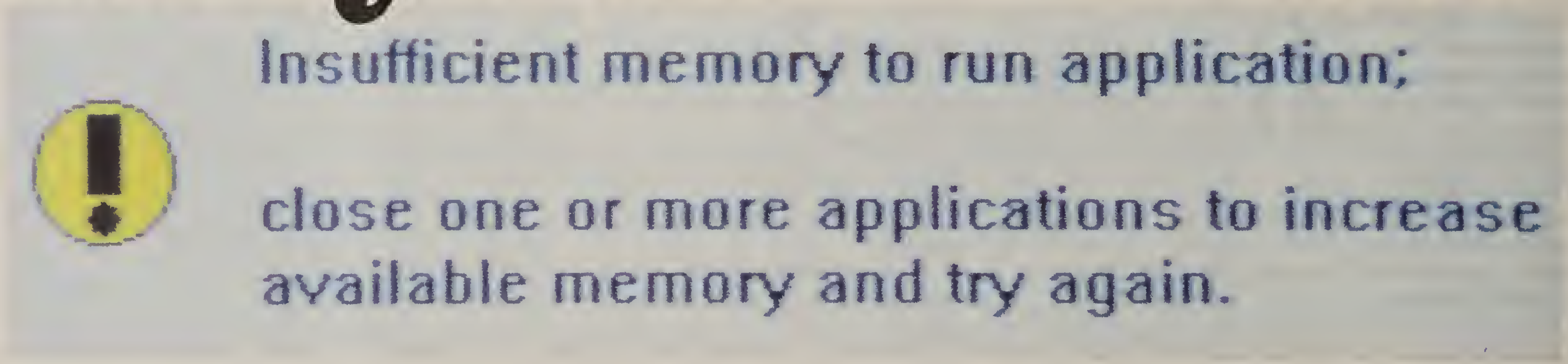

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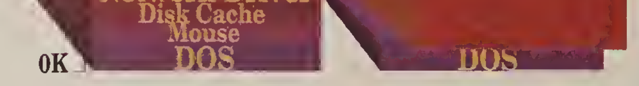

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VISTA

FROM PAGE 51

rience and completely change it to a different kind of financial services company," Gigerich says.

Theobald's vision, and the challenge it meant, drew Gigerich to Continental. "Tom had a different strategy, a different view of how the financial services market was going to evolve, and I saw it as an opportunity to be part of something new and different," Gigerich says.

"The profile of what you do with technology is a dramatic change — it's almost like I changed industries," Gigerich adds.

Dramatic change is certainly in keeping with Theobald's vision of making Continental a bank that does high-volume transactions for a limited customer base. The job of IS, Gigerich says, is "very simple: Give us a technology strategy that supports the business strategy."

Simple to say, but harder to do. Gigerich is faced with the task of selling radical change to a $29 billion organization that is still more than 25% owned by the FDIC. He acknowledges the project will be "difficult" while lounging with his foot over the arm of a comfortable easy chair in his office.

"What really gets exciting is that you move from thinking of the bank as a transaction processor to an information-based company where you get information in a rifle-shot one-off" type of transaction, Gigerich says. "One-off" is lingo for a custom transaction built to meet a specific customer's needs, rather than a standard product offering.

Such a strategy demands applications that put up no barriers to bank employees who seek information on a customer, regardless of whether they sit on the network, in a branch or with a laptop in a customer's office. Continental will create an overarching central database of customer information based on IBM's DB2. Account officers will be able to download everything the bank knows about the customer, then tailor the appropriate financial services to that person or firm.

According to the agenda

Continental has an aggressive development plan to meet its five-year goal of implementing VISTA. The strategy features heavy emphasis on computer-aided software engineering tools such as Knowledgeware, Inc.'s Information Engineering Workbench and Easel Corp.'s Easel.

Thanks to these tools, Gigerich says, no piece of the applications puzzle should take more than six months to design and implement. The first project, an application to support Continental's agency loan distribution group, took less than 60 days.

Gigerich is trying to engineer a complete change in the way IS personnel think about development, Richards says. Gigerich defines change by saying that "you gotta kill what is before you bring in what the new thing is."

"Killing what is" has required a complete rethinking of the business' architecture, and that has occupied most of Gigerich's time since he came to Continental and immediately restructured the entire IS organization.

But the shake-up he started was just the beginning. He's working now to keep the plan on track and get 6,000 Continental Bank employees to learn how to change with the new system.

This process has taken the better part of a year. Gigerich directed the interviewing of hundreds of key employees, got loan officers and other employees assigned from other parts of the business to IS, ran more than 50 focus groups and pounded out miles through Continental's hallways talking up the plan. The rollout plan included a three-hour presentation that was shown to 1,200 Continental employees at different times..

"It wasn't a cakewalk," Gigerich says. "It was cantankerous, argumentative, emotional during the process. You're dealing with things like 'How can we afford to sit here for 10 hours and talk about what we want to do in 1992 when we can't get what we need today?' Or, 'You guys in technology have never done anything right before; why in the hell should I waste my time talking to you?' And those were the kind opening shots."

VISTA's success depends on this all-out selling effort. Critical to that effort is the role played by Ruth Moederson, hired by Gigerich to serve as managing director of information technology services (ITS) strategic technical planning, and Theobald's belief that technology is second only to the bank's employees in making his vision come true.

"I think most people don't take the time to do it the way Ruth and John did," Richards says. "They worked at the very highest levels and kept [Theobald and his vice-chairmen] involved all the way through. Second, they focused on the things that were essential to Theobald's vision."

Richards notes that systems people, usually express initial enthusiasm for a project, but when things become difficult, they revert to familiar habits. He says Gigerich "refused to yield to that."

"Thirdly, they spent a lot of time and care on the rollout and getting the buy-in, which I think is going to pay off in the long run," Richards says.

If you're John Gigerich, it's all part of adding ducks to your row.

The challenge of change

Continental Bank is in the process of significantly changing the way it does business, but CIO John Gigerich points out that it is also changing "the way technology has done business."

"When you're building standard products, you think about technology from the perspective of scale, consistency, cost and replication," he says. "When you're building a technology platform to support customer-driven [strategy], it's a whole different mind-set. You're thinking about flexibility, repackaging and information accessibility."

With the mind-set comes the challenge of change, and managing that change within the realm of the IS department can be the most difficult task a manager can face.

"The toughest part of the change in many ways is within technology itself, because we trained people to do things standard ways, with a high level of replication," Gigerich says. "What we're really trying to do now is learn a different way of doing analysis, of doing systems design, to be dependent on other people for key parts of their system, to use somebody else's code or trust somebody else's data file."

Gigerich adds that IS people now have to focus on "what the business is trying to do and not on the technology and how to use it."

The staff of Continental's IS department has reacted in predictably mixed fashion: Some hate it, some love it, most are in between. Gigerich is happy with his staff and has worked hard to make sure that the huge change doesn't prompt walkouts.

Members of the IS department are receiving extensive training and are rotating between the divisions that implement VISTA and those that support Continental's current IS needs. Employees receive frequent evaluations, to help curb feelings of being left behind.

MICHAEL FITZGERALD

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SEPT. 2-8

Focus on Automation. San Francisco, Sept. 4-6 — Contact: Bonnie Walsh Associates, Staten Island, N.Y. (718) 979-1012.

Fose's CD-ROM Conference and Exposition. Washington, D.C., Sept. 5-6 — Contact: National Trade Productions, Alexandria, Va. (703) 683-8500.

Great Southern Electronics and Computer Expo. Jacksonville, Fla., Sept. 7-9 — Contact: Great Southern Shows, Jacksonville, Fla. (904) 743-8000.

SEPT. 9-15

Adding Image Processing to Information Systems. Toronto, Sept. 9-11 — Contact: Technology Transfer Institute, Santa Monica, Calif. (213) 394-8305.

Open Systems Applications Development Conference. San Jose, Calif., Sept. 9-12 — Contact: Unify, Sacramento, Calif. (916) 920-9092.

Automated Operations Symposium and Exhibit. San Diego, Sept. 10-11 — Contact: Association for Computer Operations Management, Orange, Calif. (714) 997-7966.

Data Storage '90. San Jose, Calif., Sept. 10-12 — Contact: Cartlidge and Associates, San Jose, Calif. (408) 554-6644.

Executive Information Systems: From Planning to Implementation. San Francisco, Sept. 10-12 — Contact: Technology Transfer Institute, Santa Monica, Calif. (213) 394-8305.

The Repository Conference. Orlando, Fla., Sept. 10-12 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

The SAA Office. Chicago, Sept. 10-12 — Contact: Technology Transfer Institute, Santa Monica, Calif. (213) 394-8305.

Networld '90. Dallas, Sept. 10-13 — Contact: H.A. Bruno, Inc., Englewood Cliffs, N.J. (201) 569-8542.

Video Expo. New York, Sept. 10-14 — Contact: Debbie Totolo, Knowledge Industry Publications, White Plains, N.Y. (914) 328-9157.

Unix International ISV Seminar. Boston, Sept. 11 — Contact: Miller Communications, Boston, Mass. (617) 536-0470

Business Intelligence Conference. New York, Sept. 11-12 — Contact: Richard Bennett, National Expositions, New York, N.Y. (212) 391-9111.

Optical Information Systems '90. Arlington, Va., Sept. 11-13 — Contact: Meckler, Westport, Conn. (203) 226-6967.

Printed Circuit Board Expo '90. Minneapolis, Sept. 11-13 — Contact: PMSI, Alpharetta, Ga. (404) 475-1818.

Integrating Image and Information Processing. Washington, D.C., Sept. 12-13 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

AD/Cycle: Evaluation and Implementation. Boston, Sept. 13-14 — Contact: Digital Consulting, Andover, Mass. (508) 470-3880.

Symposium on Object-Oriented Programming. Poughkeepsie, N.Y., Sept. 14-15 — Contact: The Association for Computing Machinery, New York, N.Y. (212) 869-7440.

SEPT. 16-22

Telecon '90 — The Evolving Telecommunications Environment. Montreal, Sept. 16-20 — Contact: Kimberly Mungham, Canadian Business Telecommunications Alliance, Toronto, Ont., Canada (416) 865-9993.

Mapping the Future of Computing and Communications. Cambridge, Mass., Sept. 17-18 — Contact: Patricia Seybold's Office Computing Group, Boston, Mass. (617) 742-5200.

DB/DC Users Group Conference. Grand Rapids, Mich., Sept. 17-19 — Contact: The Fox Group, Troy, Mich. (313) 689-6777.

Design Engineering Show & Conference/West. Anaheim, Calif., Sept. 17-19 — Contact: Design/West, Stamford, Conn. (203) 964-8287.

Graphics & Multimedia Conference and Exposition. Long Beach, Calif., Sept. 17-19 — Contact: Exposition Management, Waltham, Mass. (617) 290-0400.

Ink-Jet Printing Conference. Boston, Sept. 17-19 — Contact: BIS CAP International, Newtonville, Mass. (617) 893-9130.

Interdisciplinary Conference. Cambridge, Mass. Sept. 17-19 — Contact: IEEE Computer Society, Washington, D.C. (202) 705-7900.

Datatech '90. Manchester, N.H., Sept. 18-19 — Contact: Beverly Gove, New England Telephone, Manchester, N.H. (603) 641-1648.

DISKCON '90. San Jose, Calif., Sept. 18-19 — Contact: DISKCON, Sunnyvale, Calif. (408) 720-9352.

Electronic Publishing '90 Conference. Gaithersburg, Md., Sept. 18-20 — Contact: National Institute of Standards and Technology, Gaithersburg, Md. (301) 977-6711.

Working with Personal Computer Local-Area Networks Seminar. Milwaukee, Wis., Sept. 19-21 — Contact: John Snedeker, Center for Continuing Engineering Education, University of Wisconsin-Milwaukee, Milwaukee, Wis. (414) 227-3120.

SEPT. 23-29

Networking/Unix '90. Atlanta, Sept. 24-25 — Contact: Sue Fredricks, Inforum, Atlanta, Ga. (404) 220-2711.

Third-Party Computer Maintenance. San Francisco, Sept. 24-25 — Contact: Frost and Sullivan, New York, N.Y. (212) 233-1080.

PC Expo. Chicago, Sept. 25-27 — Contact: H.A. Bruno, Inc., Englewood Cliffs, N.J. (201) 569-8542.

C++ at Work '90 International Conference. Secaucus, N.J., Sept. 25-28 — Contact: Richard Friedman, SIGS Publications, Conference Division, New York, N.Y. (212) 274-0640.

Internetworking for the '90s. Washington, Sept. 25-28 — Contact: U.S. Professional Development Institute, Silver Spring, Md. (301) 445-4400.

Portable Computing and Communications Exposition and Conference. New York, Sept. 27 — Contact: Michael Sullivan, IDG Conference Management Group, Framingham, Mass. (800) 225-4698.

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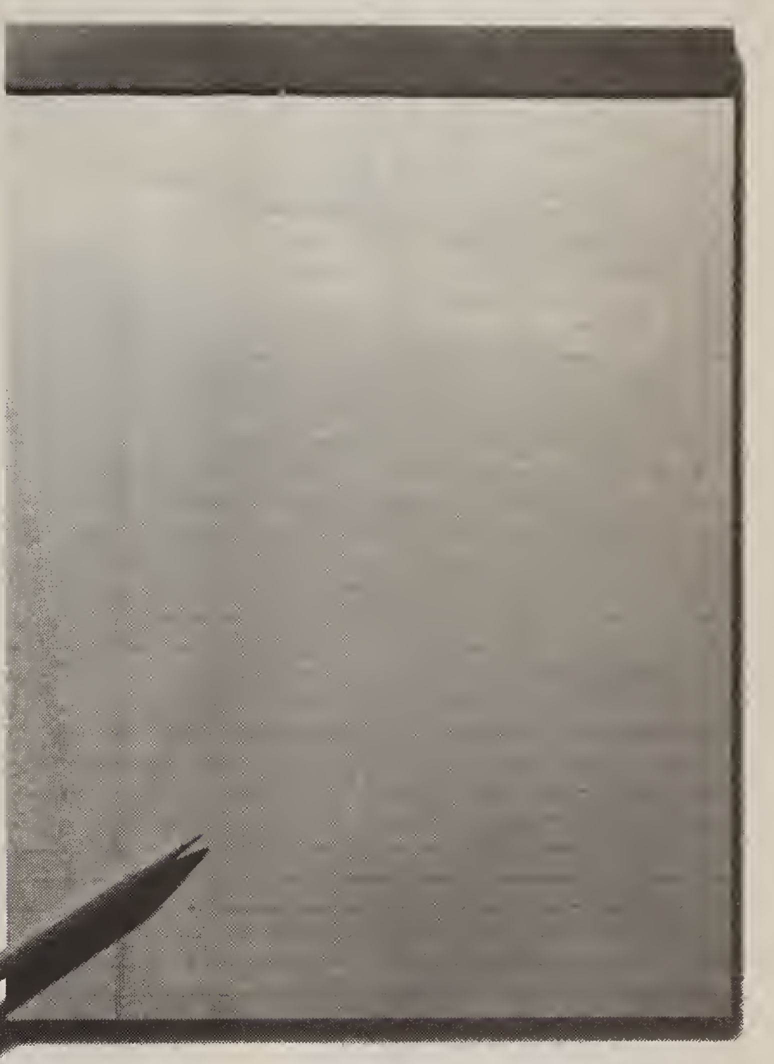

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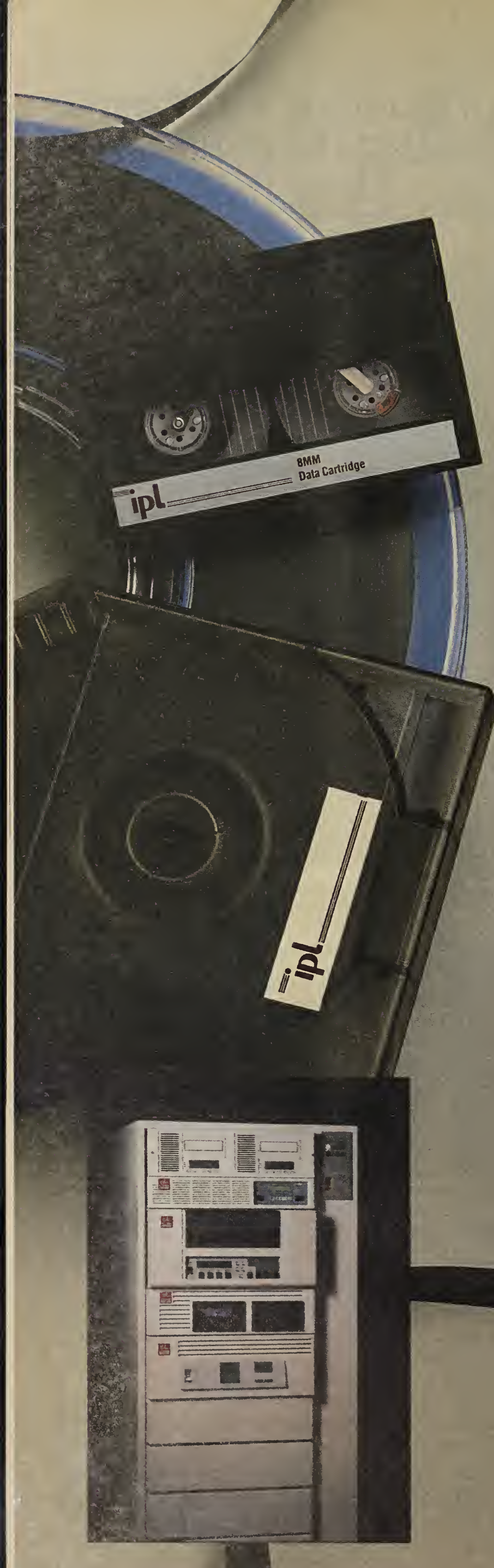

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STORAGE TECHNOLOGIES

Putting data in its proper place

BY ALAN RADDING

Name a storage device, and George DiNardo probably has it — be it an automated tape library, an optical-disc jukebox, a disk-array setup or a solid-state disk. As executive vice-president of information management at Mellon Bank in Pittsburgh, DiNardo juggles billions of bytes on a daily basis for the money center bank itself, as well as for several hundred client banks.

Conventional direct-access storage devices (DASD) could never fill Mellon's storage bill. Magnetic disks provide quick access and read/write/erase functionality. At $10 to $20 per megabyte, however, they are expensive, especially when you consider that a tape or optical system is $1 and $5 per megabyte, respectively.

Furthermore, each time you add more DASD, it eats up more floor space, system power and air-conditioning.

Storage managers today have the luxury of exploring other media — either paying more for faster performance and a smaller form factor or paying less for something that's "fast enough."

New technologies — such as redundant arrays of inexpensive disks (RAID) and extended memory — are entering the picture, along with new formats and ways to set up tried-and-true media such as solid-state disks, tape and optical media. These are making the once-straightforward progression from random-access memory to magnetic disk to tape more complex.

Nobody is about to pitch his DASD out the window; in fact, 926,750G bytes of DASD will ship worldwide in 1994, totaling 23% growth from 1990, according to Jay Bretzmann, program manager of storage research at International Data Corp. (IDC), a market research firm in Framingham, Mass.

The days are gone, however, when people routinely buy more DASD media to solve every bottleneck. "We've gotten to the point where we just can't add any more DASD. We can't manage it," Bretzmann says.

"Explosive growth in the amount of data generated by increasingly faster and more powerful processors has resulted in the need for efficient, cost-effective mass-storage systems," says Sanjay Ranade, a computer scientist at ST Systems Corp., a systems integrator in Lanham, Md., who wrote a paper on the subject in the "Optical Information Systems" journal.

The resultant storage systems, he says, fall not into the traditional storage hierarchy consisting of on- and off-line storage but add a new dimension; namely "in-line" and "near-line" storage.

"Managers are only just beginning to understand what a storage hierarchy buys them," Ranade says; namely, a chance to trade higher performance for lower costs.

In-line storage tops the new storage hierarchy, in the form of RAM disks, disk cache and solid-state disks. These technologies offer speeds of 0.3 msec — faster than the 15 msec promised with DASD — but for a very high premium.

Paul Fisch

INSIDE

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Users rate Amdahl's 6380-K top triple-density DASD. Page 68.

Product Guide
A comprehensive listing of disk emulation products. Page 71.

Currently, only DASD occupies the second tier — on-line storage. A rival is appearing on the horizon, however, in the form of RAID, which is based on 5¼-in. disk technology and is said to near and even beat DASD on-line speeds. Most DASD vendors plan to offer this technology by 1992.

Near-line storage, a term copyrighted by Storage Technology Corp. in Denver, sits on the third level of the hierarchy and is available in two forms, both of which combine storage media with robotics: automated tape libraries (ATL) and, for some purposes, optical-disc jukeboxes.

Near-line systems typically respond within 10 to 20 seconds — the time it takes the robotic arm to locate the cartridge or optical disc and load it into a drive.

Most people consider optical media too slow to be considered near-line storage in the data center, although its speed is acceptable in specialized applications or when used in conjunction with magnetic storage. It is often placed more toward the fourth tier of the hierarchy — off-line storage.

Joining optical media at this level are reel-to-reel tape and microfilm, with a cost of pennies per megabyte. These are ideal for archiving historical data that may rarely, if ever, be accessed. Access times can be minutes, hours and even days.

For applications that cannot tolerate any type of performance slowdown or for which even the mechanical process of DASD is too slow, data managers pay the premium for in-line storage. "In today's economy, [in-line storage] is something of a luxury," Ranade says.

RAM disk and cache memory — also known as expanded memory — are built into systems by the computer manufacturer. They reside on the CPU side of the controller and as such are not prone to channel bottlenecks as is DASD storage, because the system never has to cross the channel to access files.

Solid-state disks, on the other

Radding is a free-lance writer in Newton, Mass.

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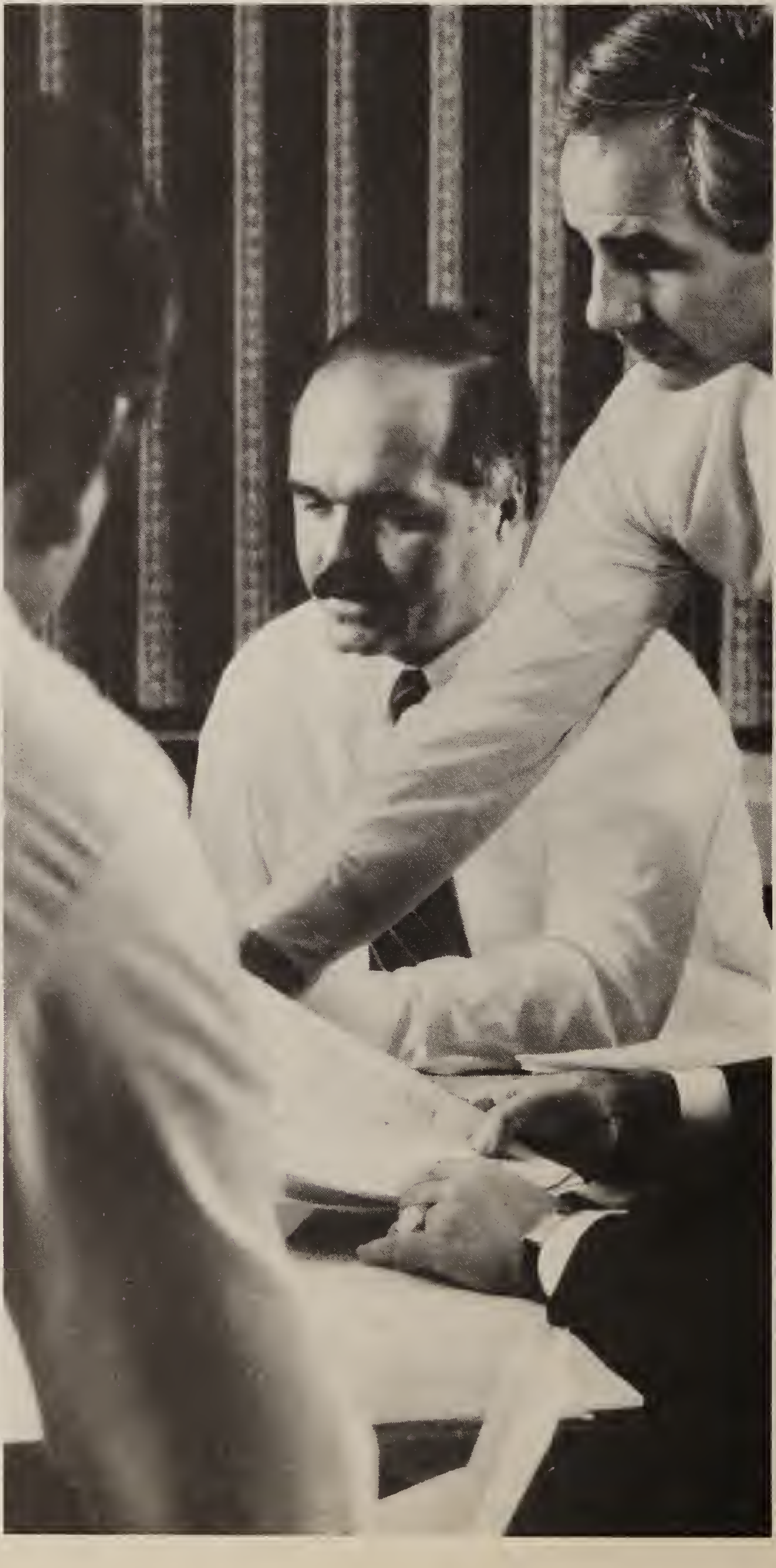

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FROM PAGE 61

hand, treat files very similarly to DASD except that, being silicon-based, there are no mechanical parts involved in locating files, making performance much higher. Solid-state disks are slower than expanded memory, because they reside on the DASD side of the channel.

This technology has been available for about 10 years from several storage vendors (see chart). Because of today's multidimensional storage hierarchy, however, they are receiving renewed interest. By 1991, IDC predicts that solid-state disk shipments will increase to more than 700,000 units, from about 500,000 this year and nearly 400,000 in 1989.

What has traditionally inhibited people from purchasing either technology is the high cost. Solid-state disks are $700 to $1,700 per megabyte, and the price for expanded memory is even higher — three to four times that of solid-state disks and 30 to 60 times higher than DASD on a per-megabyte basis, Bretzmann says.

Alabama's Benton *looks forward to introduction of RAID*

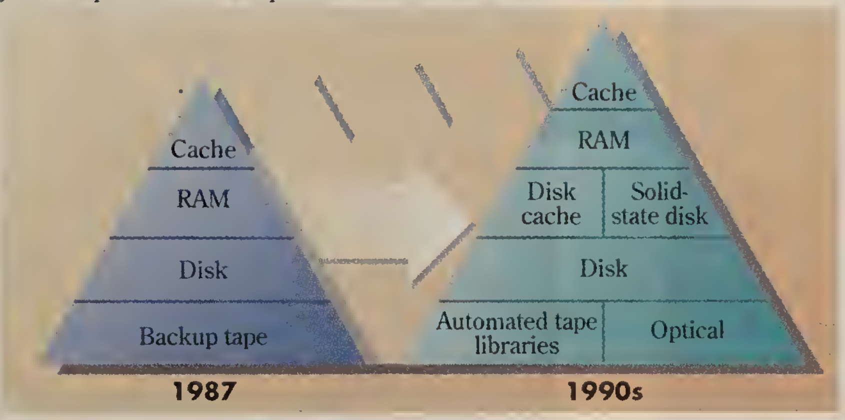
DASD is also considered expensive but not nearly to the same degree. It also satisfies a larger majority of needs. That is why there is much excitement about the possibility of a lower cost alternative in RAID.

The basic idea behind RAID is to "replace a single large drive with an array of many smaller drives" to obtain the same or better performance levels, according to researchers David Patterson, Peter Chen, Garth Gibson and Randy Katz at the University of California at Berkeley, where much of the theoretical research on RAID was done.

The arrays are made up of 5¼-, 3½-in. or larger format magnetic disks. Equivalent or better performance than DASD is achieved because many small requests can be serviced independently, while large requests are handled in parallel, spread across several disks. Speed can be increased further through data-striping and other techniques.

Storage evolution

The traditional storage hierarchy – random-access memory to disk to backup tape – has become more complex as disk cache, solid-state disks, faster tape media and optical media enter the scene



CW Chart: Paul Mock

With the increased number of disks comes a higher likelihood of failure. To offset that, developers build in fault tolerance through either redundancy (disk mirroring) or parity checking. The array dedicates one disk to tracking parity information and uses that information to restore any data lost because of the failure of another disk in the array.

Some analysts, such as Bretzmann, predict that RAID will ultimately replace DASD because of its lower cost and higher reliability but not until the late 1990s.

Almost every DASD vendor has plans in the works to announce a RAID system in the 1992 time frame, including IBM, Storage Tek and Memorex Telex N.V. Aptec Computer Systems, an OEM in Beaverton, Ore., currently packages Storage Tek's RAID technology in its high-performance storage subsystems used in government and military supercomputing situations.

RAID drawbacks

Because it is not a completely tested storage concept, however, RAID draws some criticism. "If the system works right, then it is great, but as soon as something goes wrong, you've got a severe migraine," says Kenneth Hallam, a partner at ENDL Consulting, a San Juan Capistrano, Calif.-based market research firm. The problem, he continues, is that "arrays don't match anything that the software is set up for," so if a problem occurs, users cannot readily determine where the problem lies because they are no longer operating in a standard storage software environment.

Nevertheless, some users are drooling for this supposed DASD alternative. For the State of Alabama, DASD capacity is expected to double to 240G bytes this year, according to Rod Benton, director of data systems management. While RAID won't be available soon enough to help him in this instance, Benton does expect to use it when products appear.

For large data centers, the main storage action is currently in the near-line storage market.

"There is an awful lot of data on DASD that doesn't need to be there," says Raymond C. Freeman Jr., president of Freeman Associates in Santa Barbara, Calif. "People need to get at [it], but they don't need it on-line."

The ATL approach has been particularly successful for this type of data, with many companies accepting the slower access times to free up DASD resources. "The movement to automate tape handling is picking up a lot of speed," Bretzmann says.

Storage Tek staked out the leading position with approximately 1,500 units sold to 700 data centers since the product has been available. Memorex Telex in Tulsa, Okla., recently entered the market with its own ATL approach, and Masstor Systems Corp. in Santa Clara, Calif., has carved a niche for itself using a proprietary tape cartridge design.

It was a tape library of 40,000 cartridges that spurred Daniel Kaberon, manager of computer performance at employee benefits consulting company Hewitt Associates in Lincolnshire, Ill., to first consider the use of an ATL in 1987. Hewitt's tape library has since grown to 100,000 cartridges.

Currently, Hewitt rotates 5,000 tapes through an ATL from Memorex Telex. Without the ATL, Hewitt would have had to double or triple its DASD, Kaberon says.

Memorex's system uses a "dynamic caching" technique based on frequency of tape use. Only a small percentage of the total number of tapes are reloaded in the unit, and after about seven days, if a tape isn't requested, it gets replaced by another. According to Kaberon, only 20% of stored tapes are used in 90% of all tape mounts.

Before the system was implemented, however, Memorex staff performed an extensive analysis of Hewitt's tape use. Such analysis is necessary because the system is modeled according to a company's file use — i.e., which files are most and least often accessed.

When Howard Miller at Boston University bought Masstor's ATL, he wanted to reduce the amount of labor involved in handling the 16,000 tapes in his library and eventually move to

---

Beyond 9-track for tape backup

BY DALE BASTIAN
SPECIAL TO CW

A few years ago, selecting a tape backup device for large DEC VAX or IBM sites was a simple matter: The only viable choice was 9-track tape.

Now, this technology is neither the only nor the most obvious choice in many situations. Many companies are considering alternative ways to back up magnetic disks, including 4mm tape, also known as digital audio tape (DAT), 8mm helical-scan tape and ½-in. cartridges of 18-track tape on IBM 3480 systems.

VAX shops seeking a less expensive or smaller alternative to 9-track are evaluating DAT or 8mm tape. Both media were initially designed for video and audio applications, but while 8mm subsystems became available for backup approximately two years ago, DAT has been available for only about six months.

Whereas you would spend $35,000 to $80,000 for a 9-track system, a complete two-drive 8mm or 4mm subsystem is priced from $15,000 to $20,000.

The trade-off on both these media is their lower capacity for unattended backup and lower speed. While 9-track devices can store 140M bytes on a complete subsystem, 8mm tape and DAT offer capacities of 3G to 4G bytes. Eight millimeter tape is actually higher in capacity than DAT, storing 2G bytes per cartridge as opposed to 1.3G bytes. Both are best used in data centers with disk capacities no higher than 5G bytes.

While neither achieves the 9-track's transfer rate of 600K to 1.25M byte/sec., 8mm tape is the faster at 230K byte/sec., compared with 180K byte/sec. on DAT.

Eight millimeter tape has less potential than DAT in data interchange applications, however, because it stores data in a nonstandard analog format. Virtually all DAT vendors plan to support the Digital Data Storage standard.

Eight-millimeter tape has gained some popularity in VAX shops in its two years of existence, even on large Vaxclusters and mainframes. Now that DEC has announced that it will adopt DAT, this 6-month-old technology should also begin to see increased popularity.

IBM and VAX shops seeking faster speed or a smaller form factor are moving en masse toward 18-track tape on ½-in. cartridges on IBM's 3480. Its transfer rate (300M byte/sec.) is more than double that of 9-track systems, while its capacity (200M bytes per cartridge) is 1½ times that of 9-track. Cartridges are about three times smaller than 9-track devices.

While 3480 technology has been on the market for more than four years, it was always considered very expensive at $100,000 per unit and large in size.

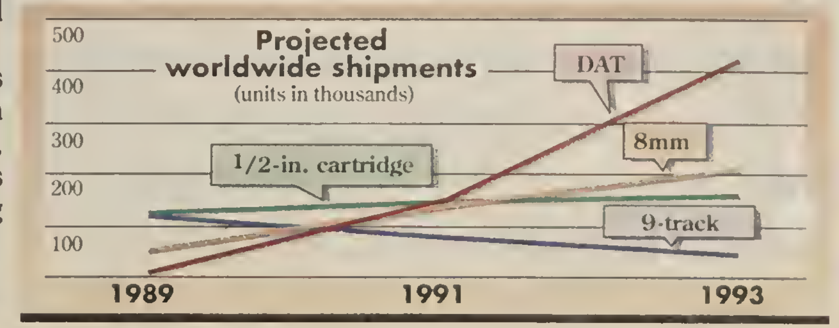
The introduction earlier this year of rack-mountable 3480-compatible devices, however, will bring its price closer to a 9-track system range at $50,000 or less. In addition, the cartridges are now 5¼-in. Primary OEM dealers of these devices are Fujitsu Ltd., Storage Tek and LMS. Vendors such as Systems Industries, Inc. and Micro Technology offer systems that can be linked to VAX machines.

Nine-track systems have their strong points, and for that reason, most companies have yet to give them up, especially for file-exchange applications and for receiving software updates. It may be years before 9-track fades completely.

Bastian is a computer support analyst at Jeppesen Sanderson in Englewood, Colo.

Tape turnover

As the focus turns away from older technologies such as 9-track tape, DAT and 8mm experience a high percentage of growth, but 1/2-in. cartridge will get increased attention



Source: Freeman Associates

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"A graphical interface is clearly important… users love 'em. But the architecture has to be designed to handle it or the performance compromise is unacceptable."

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Since buying two units — one for backup — Miller eliminated 80% of the people formerly involved in tape handling and also improved service levels. Miller estimates that the move to ATL has saved $2.5 million in salaries and what would have been DASD purchases. "We haven't added DASD in 18 months," he says.

The Masstor system also helped BU save on $200,000 worth of floor space. Masstor's proprietary cartridge design stores more data than the usual ½-in. cartridge. Miller would have had to purchase several ATLs from Storage Tek and Memorex Telex to store his 16,000 cartridges; with Masstor, he requires just one unit.

Some users are put off by Masstor's use of a proprietary storage format, however, citing its lack of interchangeability with conventional tape cartridge systems and the need to convert existing tapes to the Masstor format.

Automated tape retrieval also appealed to Thomas Pumo, director of technical services at Reader's Digest Association, Inc. in Chappaqua, N.Y. Pumo says that his investment in five Storage Tek units (one in June 1989 and four more last February) has saved him "a couple of hundred thousand dollars" on DASD and allowed him to run his operation with 12 fewer people.

The company replaced 40 IBM 3480 tape transports with the equivalent number of Storage Tek transports. Response times, Pumo says, are less than 30 seconds — down from a couple of minutes.

Reader's Digest is considering optical storage for some specialized applications but has decided against using it as a tape alternative. "We have 100,000 tapes, so we wanted to stay with tape," Pumo says.

Although optical technology is drawing increased attention, even its proponents say it is not yet ready for the large data centers. "Optical can hold the equivalent of 15 to 30 reels of tape on one disk and have random access," but it is still comparatively slow, says Richard Fisher, vice-president and general manager at Rothchild Consultants in San Francisco.

A number of compromises have appeared on the horizon, however. One is flexible optical tape, which is in development at Memorex Telex. This hybrid technology offers access times equivalent to tape yet can store more data. This optical tape, Fisher says, can be put into a standard 3480 tape cartridge and hold 50G to 70G bytes of data and could even be managed in existing tape libraries.

By combining optical with magnetic storage, Epoch Systems in Westboro, Mass., has developed a system that reaches near-line speeds.

The system combines 2G bytes of magnetic disk storage with 30G bytes of optical jukebox storage, says W.W. Souder, director of formation evaluation at Phillips Petroleum Co. in Bartlesville, Okla. The oil firm replaced two magnetic disk servers with a 32G-byte Epoch-1 Infinite Storage Server on an Ethernet local-area network to handle a database of oil well logs. The Epoch handles all data management, moving files between optical and magnetic media when users call for them. "We don't care if it is on magnetic or optical. The system takes care of that," Souder says.

INVESTING IN five Storage Tek units has saved "a couple of hundred thousand dollars" on DASD.

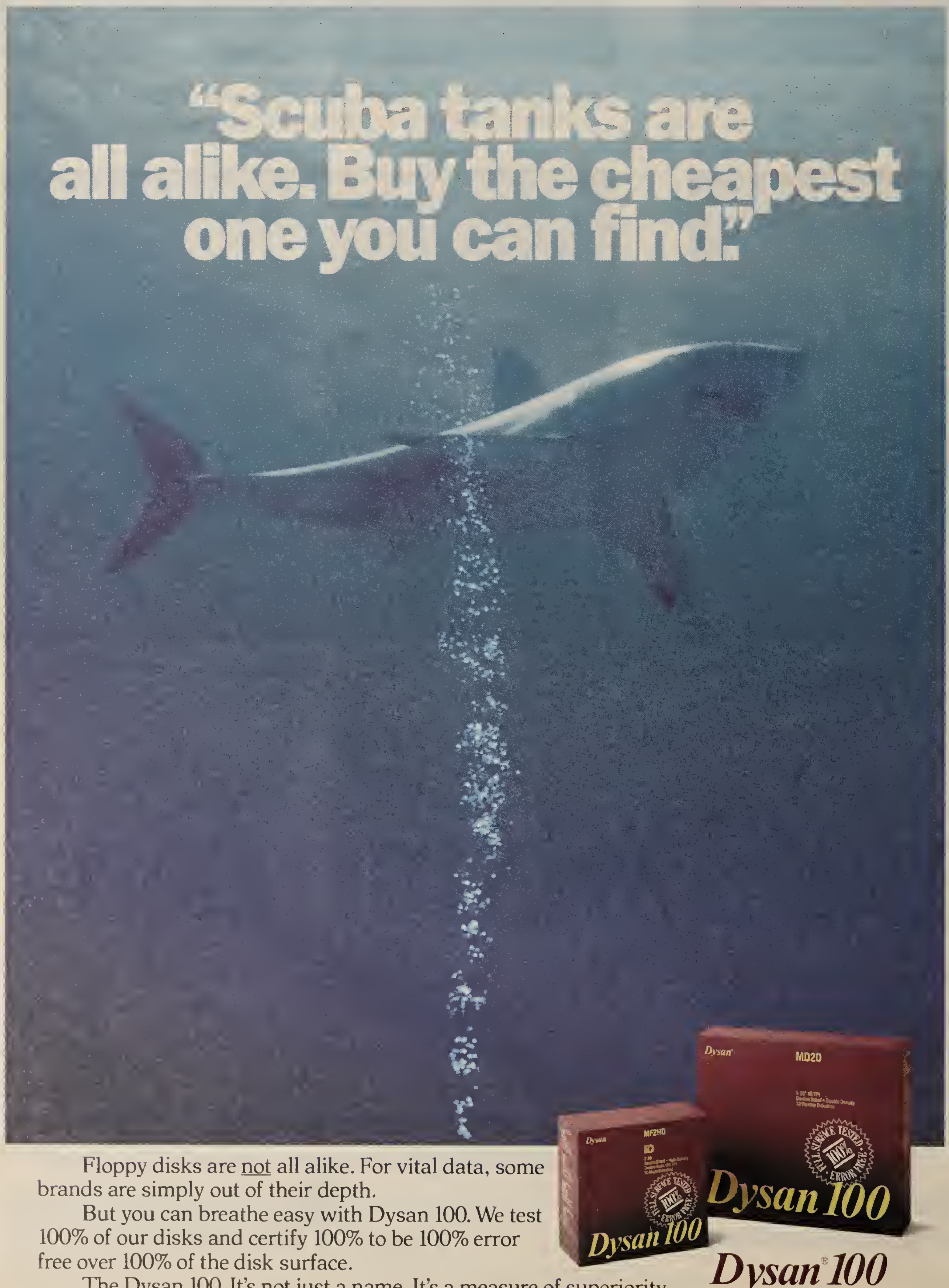
THOMAS PUMO
READER'S DIGEST

Through its robotic design, a write-once optical jukebox system from Filenet Corp. in Costa Mesa, Calif., is able to achieve near-line speeds. Vertical cartridge handling, simultaneous access across multiple drives and the use of brushless servomotors result in 40% systems performance gains, the firm says.

While some vendors are addressing the speed issue of optical technology, Fisher does not expect it to approach the current speed of magnetic media until the middle of this decade.

As a result, most data centers will continue to place optical in specialized applications that can abide by off-line speeds. "We use optical to store reports. It saves us a lot of paper," says Gregg Kirkland, vice-president and cashier at Central Bank, a small bank in Fairview Heights, Ill. "We cost-justified the system based on what we would save in one year's paper reduction," he says.

Whether the goal is to reduce storage costs, speed data retrieval, use less floor space or just find somewhere to stash an ever-increasing abundance of data, people are building more complex storage systems today than ever before. DASD is not about to go away; conversely, it will be used to its fullest potential as companies learn how to best allocate their data. ●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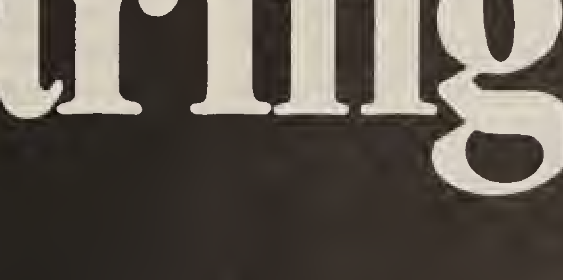


The Newsweekly of Information Systems Management

BUYERS' SCORECARD

Users rate Amdahl's DASD best of class

BY MICHAEL L. SULLIVAN-TRAINOR
CW STAFF

Many business gains are achieved by taking advantage of someone else's mistakes. This is especially true in the battles among IBM and the plug-compatible hardware vendors.

Amdahl Corp. excels at carving a niche out of IBM's miscues. Even though it has only 7% of the direct-access storage device (DASD) market compared with IBM's 81% share, the firm's triple-density DASD earned the highest user ratings among the products considered in *Computerworld's* Buyers' Scorecard survey on DASD.

The survey compared ratings from 50 users of each of the triple-density DASD products in the IBM environment. Scores are derived by multiplying the ratings each user group gave its own product by the importance factors all users assigned to the 13 criteria.

Following closely behind Amdahl's 6380-K in achieving high overall ratings was Hitachi Data Systems Corp.'s 7380-K. Both companies ranked significantly ahead of IBM's 3380-K. IBM's 3390, the next-generation follow-on to the 3380, also received strong ratings from users. (See ratings and methodology, next page.)

Despite operating in an IBM-dominated environment, Amdahl scored highest in providing compatible DASD to installed hardware. In addition, the 6380 scored high ratings in cost-per-megabyte of storage and reasonable acquisition and maintenance costs.

"The 6380 gave us a technology improvement — we moved from a non-cache environment to cache — at a substantially lower price than anything else on the market," says Joseph Donnelly, director of data services at Mastercard International, Inc. in St. Louis. "Our analysis showed that [Amdahl's] 6100 controller and the 6380 with cache capability offered superior performance to IBM's 3990 controller."

Hitachi's 7380 edged past Amdahl's 6380 in the criterion most important to users — reliability. Hitachi also inched ahead of Amdahl in overall performance. However, Amdahl topped nine out of the 13 user ratings.

Also scoring higher than the 3380 was Memorex Telex Corp.'s triple-density products. Although the company has only a 1% share of the market, its users rated it above IBM in reliability, cost-effectiveness and ease of use.

The 3380 did not take the highest marks in any category, and its ratings overall were significantly lower than most of its competitors. Users gave the product some of its strongest marks in the areas of compatibility, reliability and service and technical support. Good scores in the last two areas represent something of a triumph of recovery for IBM. In 1988, IBM identified a bearing problem in the 3380's head-disk assembly and has been working with individual users to repair it.

Lowest rated among the DASD systems was Storage Technology Corp.'s 8380-R33 drive. Better known for its automated tape systems, Storage Tek holds 5% of the DASD market. However, the 8380 ranked last or second to last in all categories.

COMPUTERWORLD BUYERS' SCORECARD

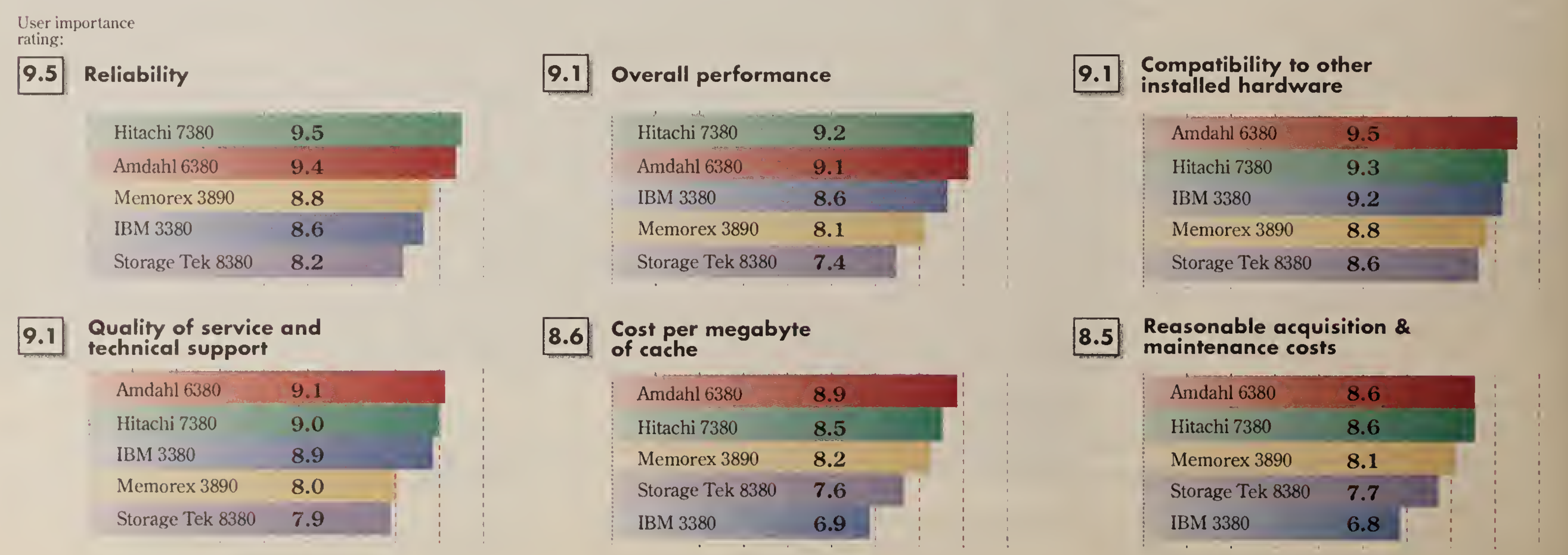
Triple-density direct-access storage devices

Total scores reflect all criteria and their user-assigned importance
Response base: 50 users per product

Product	Three highest ratings	Three lowest ratings
Amdahl Corp.'s 6380-K SCORE 74.8	Compatibility to installed hardware Reliability Ease of operation	Cache effectiveness Acquisition & maintenance costs Floor space needs
Hitachi Data Systems Corp.'s 7380-K SCORE 74	Reliability Overall performance Ease of expansion	Cache cost/megabyte Cache effectiveness Storage cost/megabyte
Memorex Telex Corp.'s 3890-0K4/2K4 SCORE 67.8	Compatibility to installed hardware Ease of operation Ease of expansion	Cache cost/megabyte Reliability Cache effectiveness
IBM's 3380-K SCORE 66.4	Compatibility to installed hardware Quality of service & technical support Overall performance	Cache cost/megabyte Acquisition & maintenance costs Floor space needs
Storage Technology Corp.'s 8380-R33 SCORE 63.2	Compatibility to installed hardware Ease of expansion Ease of operation	Reliability Floor space needs Environmental controls

KEY RATINGS

Hitachi's 7380 receives the highest ratings in the two criteria of most importance to users: reliability and overall performance. However, Amdahl's 6380 tops the field in compatibility and service/support along with seven of the remaining nine categories.



CW Charts: Paul Mock

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   - 32. Programmers, Software Developers
   - 60. Sys. Integrators/VARs/Consulting Mgt.

   OTHER COMPANY MANAGEMENT
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President, Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales & Mktg. Management

   OTHER PROFESSIONALS
   - 70. Medical, Legal, Accounting Mgt.
   - 80. Educator, Journalists, Librarians, Students
   - 90. Others ______ (Please specify)
3. **COMPUTER INVOLVEMENT** (Circle all that apply)
   Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - A. Mainframes/Superminis
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Local Area Networks
   - F. No Computer Involvement

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   - 60. Government - State/Federal/Local
   - 65. Communications Systems/Public Utilities/Transportation
   - 70. Mining/Construction/Petroleum/Refining/Agric.
   - 80. Manufacturer of Computers, Computer-Related Systems or Peripherals
   - 85. System Integrators, VARs, Computer Service Bureaus, Software Planning & Consulting Services
   - 90. Computer/Peripheral Dealer/Distr./Retailer
   - 75. User: Other ______
   - 95. Vendor: Other ______ (Please specify)
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   - 21. Dir./Mgr MIS Services, Information Center
   - 22. Dir./Mgr. Tech. Planning, Adm. Svcs., Data Comm. Network Sys. Mgt.; Dir./Mgr PC Resources
   - 23. Dir./Mgr. Sys. Development, Sys. Architecture
   - 31. Mgrs., Suprv. of Programming, Software Dev.
   - 32. Programmers, Software Developers
   - 60. Sys. Integrators/VARs/Consulting Mgt.

   OTHER COMPANY MANAGEMENT
   - 11. President, Owner/Partner, General Mgr.
   - 12. Vice President, Asst. VP
   - 13. Treasurer, Controller, Financial Officer
   - 41. Engineering, Scientific, R&D, Tech. Mgt.
   - 51. Sales & Mktg. Management

   OTHER PROFESSIONALS
   - 70. Medical, Legal, Accounting Mgt.
   - 80. Educator, Journalists, Librarians, Students
   - 90. Others ______ (Please specify)
3. **COMPUTER INVOLVEMENT** (Circle all that apply)
   Types of equipment with which you are personally involved either as a user, vendor, or consultant.
   - A. Mainframes/Superminis
   - B. Minicomputers/Small Business Computers
   - C. Microcomputers/Desktops
   - D. Communications Systems
   - E. Local Area Networks
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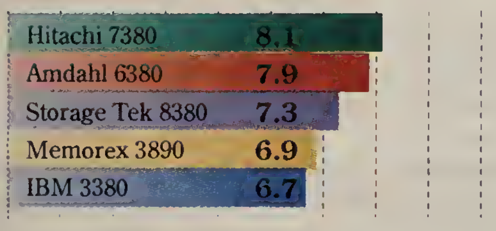
A CLOSER LOOK

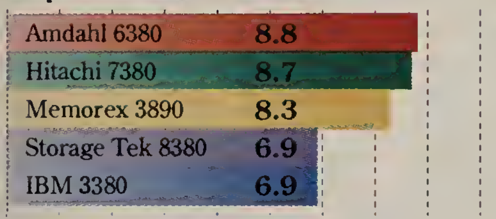
Users of IBM's 3380 give it low ratings in terms of cost and floor space requirements. Memorex's 3890 comes in a strong third in most of the ratings. Storage Tek's 8380 receives low ratings overall, scoring its highest mark in ease of operation.

User importance rating:

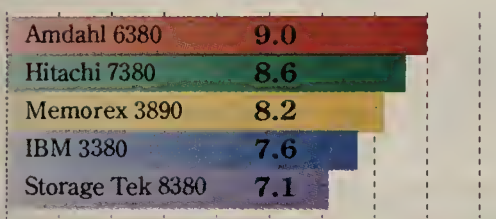
8.0 Cost per megabyte of cache



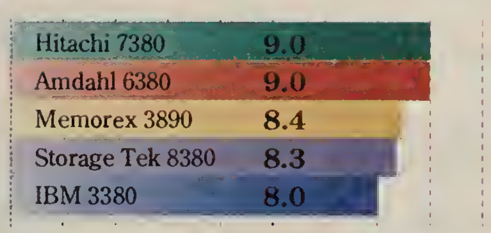
7.9 Reasonable floor space requirements



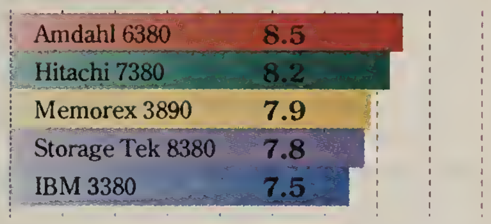
7.8 Efficient environmental controls



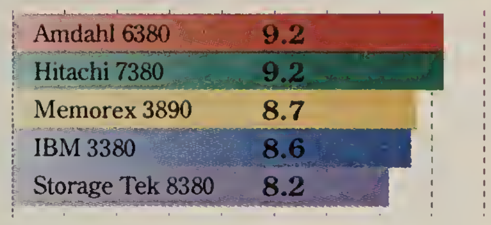
8.0 Ease of expansion



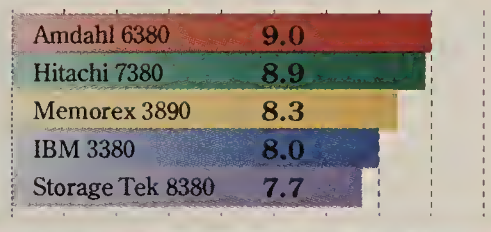
8.0 Effectiveness of cache features



7.8 Ease of operation



7.5 Reasonable learning curve



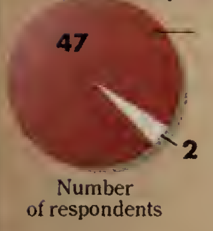
Loyalties

Would you buy the product again?

(Reasons based on most frequently stated responses)

Amdahl 6380

Response base: 49

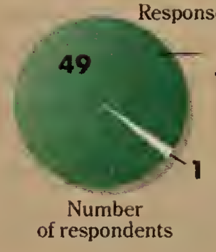


Likely
The reason:
Good service & support

Unlikely
The reason:
Want to compare with 3390

Hitachi 7380

Response base: 50

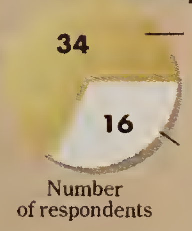


Likely
The reason:
Reliability

Unlikely
The reason:
Features inferior to IBM's

Memorex 3890

Response base: 50

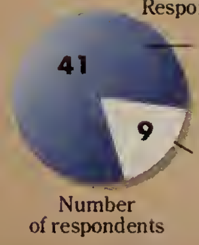


Likely
The reason:
Price/performance

Unlikely
The reason:
Old technology

IBM 3380

Response base: 50

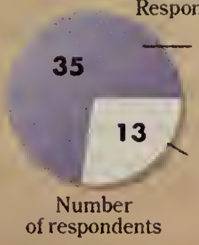


Likely
The reason:
Reliability

Unlikely
The reason:
Moving to 3390

Storage Tek 8380

Response base: 48



Likely
The reason:
Price

Unlikely
The reason:
Unreliable

Drive devotion

IBM's 3390 DASD has overcome delivery problems and last-minute fixes to win allegiance among users of high-end storage devices. Fifty users surveyed by Buyers' Scorecard gave the product very high marks for reliability, performance and ease of use. IBM's technical service and support also remain highly rated in its latest DASD endeavor.

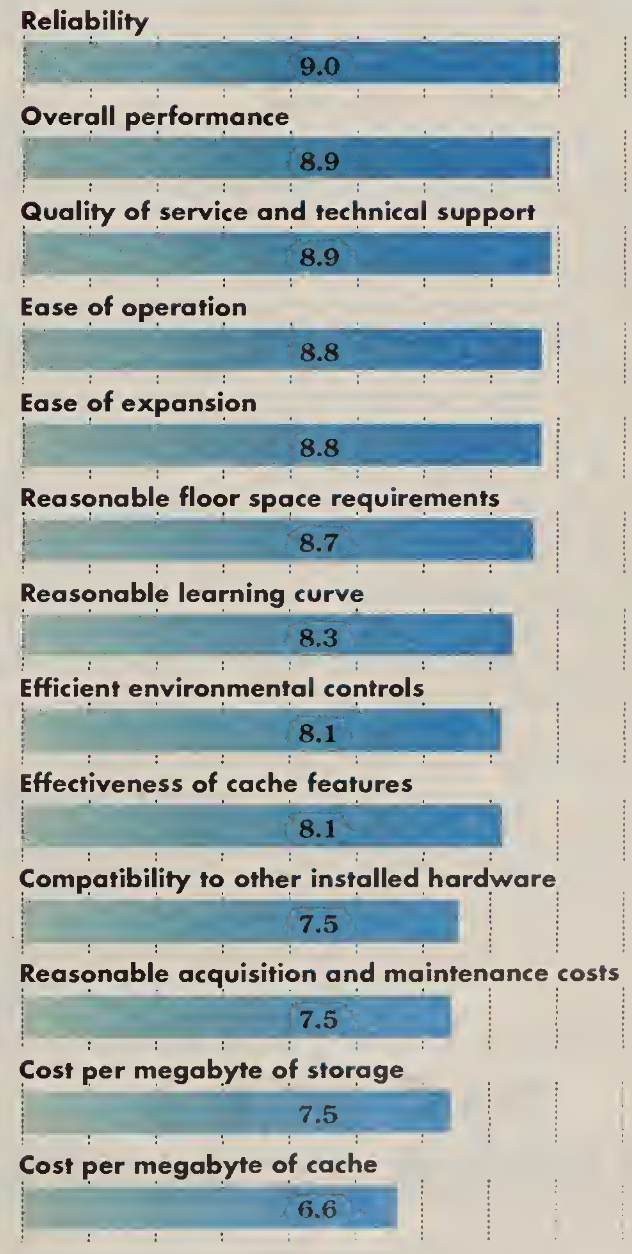
However, the higher capacity and performance IBM is offering with the 3390 also come with a higher price tag. Users rated price/performance payoffs at the bottom of the list of 13 criteria. The cost per megabyte of cache received the lowest ratings.

Despite the perceived imbalance between capability and cost, 43 of the users surveyed said they would be very likely to purchase the product again if they were making the choice today, and the remaining seven said they would be somewhat likely to purchase the product again.

Respondents also provided a laundry list of features that they would like to see added to the 3390. Heading the list was improved cache features at the data-set level, followed by increased density and lower cost.

IBM 3390 RATINGS

Response base: 50



METHODOLOGY

Products rated in *Computerworld*'s DASD Buyers' Scorecard were selected in the following manner: The products had to operate in the IBM mainframe environment and be triple-capacity direct-access storage devices (DASD) comparable to the IBM 3380-K. The IBM 3390 was rated because it represents the next generation of high-end DASD. Because its larger capacity and different performance features preclude direct comparison with the other models currently on the market, user ratings for that product are presented separately.

Ratings for each product were based on responses from 50 randomly selected users culled from lists provided by independent sources.

The market share for the vendors included in the survey is as follows: IBM's 3380 — 81%; Amdahl Corp.'s 6380 — 7%; Hitachi Data Systems Corp.'s 7380 — 6%; Storage Technology Corp.'s 8380 — 5%; and Memorex Telex Corp.'s 3890 — 1%.

According to the survey, 38% of the 300 sites use IBM 3090s, 19% use Amdahl mainframes, 18% use IBM 4381s, and 10% use Hitachi mainframes.

Of the 300 respondents, 92% have been using storage products for five years or more. Of those polled, 56% are operations managers, 37% are IS managers, and 7% are DASD managers.

Of the respondents, 60% use caching features to increase performance. The sites have an average of six DASDs attached to each controller.

The survey was conducted via telephone interviews by First Market Research in Austin, Texas. Result tabulation was performed by IDG Research Services in Framingham, Mass.

The total scores, which are weighted according to the criteria that all respondents find most important, were computed by multiplying the mean scores all users assigned to the importance of each criterion by the mean scores each user group gave to its own product.

For example, the criterion — reliability — received a mean importance rating of 9.5 on a scale of one to 10. Amdahl's 6380 users gave the product a 9.4 for performance in this area. To find a final score, these two factors were multiplied for a score of 89.3. This number was then added to the other totals of criterion importance ratings and performance ratings. This sum was then divided by the number of ratings for a total score of all 13 criteria.

ACKNOWLEDGMENTS

Computerworld would like to acknowledge the assistance provided by the following individuals and organizations in the preparation of this month's Buyers' Scorecard: Bob Abraham, Freeman Associates, Inc.; Crawford DelPrete, International Data Corp.; James Porter, Disk Trends; Computer Intelligence; and Installed Technology International.

Why SMS spells jumble

BY BARBARA BOCHENSKI

Like a partly finished puzzle, IBM's evolving system managed storage (SMS) is missing a few pieces. This means only good things to independent software developers, which are promoting existing products — and creating new ones — to fill in the blanks.

A pieced-together automated storage management system may not be so ideal for users, but it does the job for people who want such a system now.

SMS automatically allocates data sets to various storage media in accordance with service requirements established by the storage administrator. Its long-range goal is to completely automate storage management.

"IBM has admitted it can't do it all," says Nick Allen, a storage management analyst at Gartner Group, Inc. IBM has invited added value, he says, and has received it from the likes of Sterling Software, Inc., Legent Corp., Innovation Data Processing and Computer Associates International, Inc.

These products attempt to address areas that IBM has not; for instance, the VM operating system.

"If DFSMS/MVS was Project Jupiter, SMS for VM is Black Hole," Allen says, referring to IBM's development code name for one portion of SMS.

IBM does remarket two VM utilities from Systems Center, Inc. in Reston, Va. VM/Backup is an automatic backup and restore system, and VM/Tape is a tape drive and volume manager. A permanent license for each product is available from Systems Center starting at $4,250.

Certain data types have also been left out of the SMS game plan, such as ISAM, OSAM, nonstandard file labels and unmovable data sets. "IBM only handles about 70% of our data," says John Brightly, technical services manager at American Tobacco in Chester, Va.

Sterling Software fills this gap with Data Management System/OS, a space management facility.

While some people lament the lack of support for active data compression, others find it causes performance problems. Nevertheless, both Innovation Data Processing in Little Falls, N.J., and Sterling offer data compression products. Innovation Access Method from Innovation Data Processing is $10,000 for an annual lease and $30,000 for a perpetual license. Sterling's Shrink/MVS costs $21,000, and its Shrink/DB2 sells for $25,000.

Storage administrators also complain that there is no way to make sure service requirements are met. They can allocate data sets to certain storage media and establish parameters such as response time, but they have no way to enforce them.

While no product can yet fulfill this need, both Sterling and Legent are helping storage administrators at least gauge the performance of preset service levels through a user interface.

Sterling Software's View is a personal computer-based user interface that lets the storage administrator see at a glance the status of the storage system. Through color-coding of screens, administrators can decide quickly whether to take action.

View is sold with Sterling's Automatic Initiation Manager (AIM), a subsystem for Sterling's overall storage management product, for $24,000.

Legent's automation storage product DASDMON identifies poor performance in on-line and batch reports. The Storage Performance Expert, a main component of DASDMON, then steps in to recommend tuning solutions and utility statements to help implement them. The product sells for $10,000 to $30,000.

Probably the biggest complaint users

Continued on page 72

Bochenski, a 30-year veteran of the IS field, is a free-lance writer and advanced computing consultant in Bellevue, Wash.

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Controllers go to center stage after years behind the scenes

BY KENNETH HALLAM

With their moving and spinning parts, disk drives draw a lot of attention as developers adjust actuator speeds, head-flying heights and rotation frequencies to decrease the time it takes these mechanical creatures to deliver data.

Disk-drive controllers — which are not mechanical but are based on semiconductor technology — have not traditionally turned heads. Their electronics are an assortment of very familiar commercial parts, including microprocessors, dynamic random-access memory, shift registers and some custom interface logic. Like an efficient waiter, these devices take orders from the customer, translate them to the drive and then deliver the requested data.

Innovations are stifled in the IBM world by vendors' fears of being labeled "noncompatible." In Digital Equipment Corp.'s domain, the company keeps its technology private by regarding its systems as closed and the interface connections for controllers, proprietary.

Controllers continue, however, to build steadily on existing strengths and acquire new capabilities. Their intelligence has steadily increased from a one-channel, eight-drive capability in the 1960s to handling up to eight channels and 64 different disk drives today.

A more far-reaching innovation on controllers is cache memory. Cache was first offered in the 1970s by independent developers, but it was never a large commercial success. Now that IBM is shipping the 3990 controller with cache memory, all the plug-compatible manufacturers offer it as well.

Controller cache memory holds either data that the controller predicts will be requested in the near future or data from a previous request on the chance that it will soon be requested again.

Other capabilities of controller cache memory include nonvolatile memory, which helps avoid data loss in the case of a power failure; fast-write, which writes channel requests first to cache and later to the drive, eliminating the time spent waiting for the disk drive to locate the correct sector; and size options, ranging from 2M to 8M bytes of capacity.

Should something go wrong with the system, expert system technology has been incorporated into controllers to simplify maintenance. First seen in 1988, these systems look at a statistical record of direct-access storage device activity and predict items that will most likely need the attention of a service engineer.

Amdahl Corp., Storage Technology Corp. and Hitachi Data Systems Corp. have all built this capability into their most recent controllers.

Longer cabling

Another problem will be solved when fiber optics replace the current cabling technology connecting the controller to the channel. Within two years, fiber optics will extend the 400-foot maximum distance that controllers can be placed from the CPU to at least one kilometer.

Another advantage of fiber-optic cabling is faster data transfer rates. The 3M to 4.5M byte/sec. limits seen today will be replaced by a 20M to 100M byte/sec. bandwidth on the fiber-optic channel. This increased bandwidth will allow controllers to operate more drives at a faster data rate than ever before.

While there are some fiber-optic offerings out today from Hitachi and IBM, these simply emulate the CPU channel, forcing timing constraints that limit the number of feet the fiber can be run. Many hardware and microcode changes must be made to controllers and CPUs before fiber-optic channels will be possible.

Five years from now, controllers will eventually take over data management capabilities from the I/O software (see story below). Outside of the IBM world, some controllers already participate in some aspects of data management. For instance, Epoch Systems in Nashua, N.H., offers a storage subsystem for Unix users that looks like a network node. The location of the data depends on the frequency of use and the priority assigned to it by the operating system. As data ages and is called for less often, it may move from a fast Winchester drive to an optical disc, then to a tape drive. All of this movement or migration is controlled by the Epoch subsystem rather than by Unix. ●

Hallam is a partner at ENDL Associates, a market research firm in San Juan Capistrano, Calif.

The understudy

Controllers are poised for a major promotion that will, within five years or so, give them primary responsibility for data flow management. Right now, that job belongs to I/O software, which is clearly struggling under the load of growing on-line databases and the task of locating an abundance of data by head, cylinder and sector address.

This change will result from a gradual move away from the Count-Key-Data format to the more efficient Fixed-Block-Architecture. With the latter, the systems software will no longer locate data according to a specific address but rather by logical block address. Specific track capacities, number of tracks per surface and other features of drive geometry will be known by the storage controller.

Eventually, the storage controller will become more of a data manager than a traffic cop. It will select the location for the data to be placed and even move it later, if the data set grows too large for that location.

KENNETH HALLAM

PRODUCT SPOTLIGHT

Solid-state disks/Disk emulators

VENDOR	PRODUCT NAME	INTERNAL OR EXTERNAL DEVICE	HARDWARE COMPATIBILITY	MINIMUM/MAXIMUM FORMATTED CAPACITY (BYTES)	AVERAGE ACCESS TIME (MSEC)	MAXIMUM DATA TRANSFER RATE (BYTE/SEC.)	TRANSACTIONS PER SECOND	DISK DRIVE EMULATION	INTERFACES SUPPORTED	MAXIMUM PROCESSORS THAT CAN ACCESS DEVICE AT ONE TIME	DATA BACKUP CAPABILITIES	VOLTAGE REQUIREMENTS	DIMENSIONS (FEET)	WEIGHT (POUNDS)	PRICE PER MEGABYTE	PRICE RANGE MINIMUM/MAXIMUM
Amdahl Corp. **(408) 746-6000**	6110 High Performance Storage	External	All Amdahl, IBM 370 architecture	64M/ 1G	0.2	4.5M	Workload-, model- and channel-dependent	IBM 3380E, 3380J, 3380K	IBM Channel	16	Battery, Winchester disk	208/415 VAC	66.5 x 48.8 x 32 (minimum), 66.5 x 64.6 x 32 (maximum)	1,060-1,325	Contact local Amdahl representative	Contact local Amdahl representative
Amperif Corp. **(818) 998-7666**	9200-30	External	Unisys-Sperry 1100/2200	36M/2.3G	0.002	9M	Application-dependent	All block mux, Sperry 8470, Word Channel	Sperry Word Channel, block mux	8	Battery, extended battery	208 VAC	60 x 24 x 40 (minimum), 60 x 122 x 40 (maximum)	850-4,250	$1,000	$132,000 (36M) - $2 million (2.3G)
	8200-30	External	Unisys-Burroughs BX900, A and V series	36M/2.3G	0.002	9M	Application-dependent	Unisys-Burroughs 659, 9494, M9710	Burroughs DLP	8	Battery, extended battery	208 VAC	60 x 24 x 40 (minimum), 60 x 122 x 40 (maximum)	850-4,250	$1,000	$132,000 (36M) - $2 million (2.3G)
Anamartic, Inc. **(408) 973-8008**	Wafer Stack	External	Any CPU with a SCSI interface	36M/ 213M	1	4.8M, 3M	700	SCSI drives	SCSI	1	Battery	120/240 VAC	8.5 x 5 x 15	18 (160M)	$120-$240	$7,000 (40M) - $30,000 (240M)
Andromeda Systems, Inc. **(818) 709-7600**	DC-64 Shadow Ram	Internal	DEC Microvax, Micro PDP-11, other Q-Bus CPUs	16M/ 256M	2	2M	500	DEC DU device	Q-Bus	8	Battery, Winchester disk, data is automatically shadowed to Winchester disk	5 volts DC	8 x 5 x 1	1.2	$250	$6,195 (16M) - $81,995 (256M)
Atto Technology, Inc. **(716) 688-4259**	Silicon Disk	Both	DEC VAX, Decstation, IBM RS/6000, Sun 3 and 4	8M/512M	0.05 (constant)	5M	20,000	SCSI drives	Unibus, Q-Bus, SCSI	7	Battery, extended battery, streaming tape, Winchester disk	5 volts DC internal, 110/220 VAC external	1.63-4.88 x 5.75 x 8.20 (internal), 5.5 x 9.4 x 13.8 (external)	13-21	$300-$330	$4,995 (8M) - $44,995 (128M)
Cray Research, Inc. **(612) 333-5889**	SSD	Both	Cray X-MP, Cray Y-MP	1G/16G	0.014	2G	71,428	NP	Cray VHISP	8	Streaming tape	208 VAC	NP	3,220	NA	$600,000 (1G) - $5 million (16G)
Dataram Corp. **(800) 822-0071,** **(609) 799-0071**	Wide Word System 2000	External	DEC VAX/VMS, Convex C1/C2, all Sun	2M/640M	0.004	200M	100-200	No exact emulation	Unibus, Q-Bus, VME	8	Battery	120/240 VAC	15.75 x 19 x 24	100-150	$280 (maximum configuration)	$28,700 (2M) - $183,400 (640M)
DDC Pertec **(818) 882-0030**	SSM-300	External	Data General Nova, DEC PDP-11, Foxboro, L & N	8M/256M	2	16M	System-dependent	DDC, General Instruments, PMI, Bryant, Diablo, CDC, Pertec	Unibus, SMD, Diablo, DDC	1	Battery, streaming tape, Winchester disk	110/120 VAC, 220/240 VAC	7 x 17.75 x 20.5	40-55	$1,750 (8M), $489 (256M)	$14,000 (8M) - $125,200 (256M)
Digital Equipment Corp. **(508) 841-3399**	ESE20 Solid-state disk	External	VAX 9000, 6000, Vaxclusters	120M/ 240M (within single cabinet)	1.3	2.5M	Application-dependent	NA	Q-Bus, BI Bus, XMI Bus, (interfaces through HSC, KDM, KDB, KDA controllers)	Multiple	Battery, magnetic media	120/208 or 220/240 VAC	60.5 x 21.3 x 36	585 (240M)	NA	$100,000 (120M) - $200,000 (240M)
EMC Corp. **(800) 222-3622,** **(508) 435-1000**	Orion	External	Amdahl, Hitachi, IBM 370 architecture	16M/ 512M	0.1	4.5M	600 per storage director	IBM 3370, 3380 and compatibles	IBM Channel	4	Battery, Winchester disk	110/220 VAC	31.4 x 15.5 x 33.31	275	$1,400	$27,400 (16M, one storage director) - $558,600 (512M, two storage directors)
Hitachi America Ltd. **(800) 283-4080** **Ext. 877**	SV 501C series, semiconductor storage device	Both	Any CPU with a SCSI interface	16M/32M (half-height), 16M/80M (full-height)	0.35	4M	NP	Full-height 5¼-in., 16M-80M SCSI drives	SCSI	1	Battery, Winchester disk	5 volts DC	1.63 x 5.75 x 8.0 (half-height), 3.25 x 5.75 x 8 (full-height)	2.1 (half-height), 2.4 (full-height)	$360 (16M), $310 (80M)	NP
Imperial Technology, Inc. **(800) 451-0666,** **(213) 536-0018**	Megaram-3380	External	IBM 370 architecture, 3030, 4300, 3080, 3090 series	32M/2G	0.3	4.5M	Application-dependent	IBM 3380, PCM	IBM Channel	16	Battery, extended battery, streaming tape, Winchester disk	208/230 VAC	71 x 22 x 32 (minimum) 284 x 88 x 128 (maximum)	500	$500	$25,000 (32M) - $800,000 (2G)
	Megaram-SCSI	External	Any CPU with a SCSI interface	16M/ 288M	0.1	5M	500	All 5¼-in. drives	SCSI	4	Battery, extended battery, Winchester disk	5 volts DC	3.25 x 5.75 x 8.2	7	$300	$3,500 (16M) - $60,000 (288M)
	Megaram-VX	External	DEC VAX, Microvax, PDP series	8M/1G	1	3.5M	750	DEC RA series	Unibus, Q-Bus	4	Battery, extended battery, streaming tape, Winchester disk	110/220 VAC	5.25 x 19 x 20	50	$500	$10,000 (8M) - $400,000 (1G)
	Megaram-SDI	External	DEC VAX, Vaxcluster	8M/1G	1	3.5M	750	DEC RA series	SDI	2	Battery, extended battery, streaming tape, Winchester disk	110/220 VAC	5.25 x 19 x 20	50	$500	$10,000 (8M) - $400,000 (1G)
	Megacard-MP	Internal	DEC VAX, Microvax, PDP series	8M/1G	1	3.3M	750	DEC RA series	Unibus, Q-Bus	4	Battery, extended battery, Winchester disk	5 volts DC	DEC standard quad-sized boards	2	$500	$7,500 (8M) - $350,000 (1G)
	Megaram-80	External	HP 1000, 3000	8M/512M	1	1M	200	All HP 7900 series	HPIB	6	Battery, extended battery, streaming tape, Winchester disk	110/220 VAC	7 x 19 x 24	80	$500	$15,000 (8M) - $250,000 (512M)
Macrolink, Inc. **(714) 777-8800**	Solid-state disk	External	Concurrent Computer Corp. 3200 series	32M/ 256M	0.005	5M	System-dependent	Controller supplied	NP	2	Battery	110/220 VAC	7 x 19 x 20	35-70	$400	Contact vendor
	VME Solid-state disk	External	Data General Avion, Sun 3 and 4, Motorola 68000 series	32M/ 256M	.005	10M	System-dependent	NA	VMEbus	2	Battery	110/220 VAC	7 x 19 x 20	35-70	$200	Contact vendor

The companies included in this chart responded to a recent survey conducted by *Computerworld.* When a vendor is unable to provide specific information about its product, the abbreviation NP (not provided) is used. When a question does not apply to a vendor's product, the abbreviation NA (not applicable) is used. Further product information is available from the vendors.

VENDOR	PRODUCT NAME	INTERNAL OR EXTERNAL DEVICE	HARDWARE COMPATIBILITY	MINIMUM/MAXIMUM FORMATTED CAPACITY (BYTES)	AVERAGE ACCESS TIME (MSEC)	MAXIMUM DATA TRANSFER RATE (BYTE/SEC.)	TRANSACTIONS PER SECOND	DISK DRIVE EMULATION	INTERFACES SUPPORTED	MAXIMUM PROCESSORS THAT CAN ACCESS DEVICE AT ONE TIME	DATA BACKUP CAPABILITIES	VOLTAGE REQUIREMENTS	DIMENSIONS (FEET)	WEIGHT (POUNDS)	PRICE PER MEGABYTE	PRICE RANGE MINIMUM/MAXIMUM
Memorex Telex **(918) 627-1111**	6890 Solid-state DASD	External	All Amdahl, Hitachi, AS/EX, IBM 4380, 3000 series	16M/ 4G	0.1	18M	2,000	IBM 3380	IBM Channel	16	Winchester disk	208/230 VAC	51.2 x 41.3 x 31.5 (minimum), 51.2 x 172.4 x 31.5 (maximum)	672-3,816	$1,500	$64,785 (16M) - $1,040,750 (4G)
Memory Sciences Corp. **(703) 361-9745**	Fastor	External	DEC VAX, Microvax, IBM 4381, 3090, 3080 series, VMEbus-based	4M/15G	1	5.5M	2,000	All DEC, IBM 3380, 3390 series	Unibus, Q-Bus, SMD, IBM Channel	8	Battery, extended battery, Winchester disk	110 VAC	60 x 24 x 30 (1G)	42-162 (1G)	$550	$17,000 (4M) - $600,000 (1G)
SCIP **(213) 282-8700**	SSx90 Solid-state disk	External	Any CPU with a SCSI interface	16M/ 432M	0.1	5M	Determined by controller	Any SCSI drive with a 16M-432M capacity	SCSI, SCSI-2	7	Battery, automatic backup/restore	5 volts DC	1.62 x 5.75 x 8 (half-height), 3.25 x 5.75 x 8 (full-height)	8	$390 (16M), $160 (432M)	$6,250 (16M) - $68,100 (432M)
See First Technology, Inc. **(408) 748-7717**	RDC-16 RAM Disk, RDE-32 RAM Disk	Internal	All Digital Q-Bus, and Unibus CPUs	16M/ 80M, (Q-Bus), 128M (Unibus)	4.3	1M	System-dependent	MSCP	Unibus, Q-Bus	1	Battery	5 volts DC	8.75 x 10.38 x .25	2	$350	$6,000 (16M) - $28,000 (80M)
Storage Technology Corp. **(800) 456-7689,** **(303) 673-5151**	4080 Solid-state disk subsystem	External	IBM 3090, 3080, 4300 series, PCM and compatible	64M/ 1.2G	0.1	4.5M	2,500-3,000	IBM 3380	IBM Channel	8	Battery, Winchester disk	208 VAC	67.9 x 22.1 x 32.4	580	$1,100-$1,600	$102,000 (64M) - $1,298,800 (1.15G)
System Industries **(408) 432-1212**	Megaram	External	DEC Vaxcluster, Unibus and Q-Bus CPUs	28.9M/ 462.4M	3.25	3M	300	DEC RA80 series	Unibus, Q-Bus, SDI, CI Bus, BI bus	4, 16	Battery, extended battery, Winchester disk	110/220 VAC	5.25 x 19 x 20	50	$1,000 (minumum configuration), $615 (maximum)	$31,050 (28.9M) - $313,950 (462.4M)
Texas Memory Systems, Inc. **(713) 771-8200**	SAM-1000	External	DEC VAX, Unibus and Q-Bus CPUs, Sun 3 and 4	64M/8G	0.0005	500M	System-dependent	NA	Unibus, Q-bus, VME, S-Bus	64	Battery	110/220 VAC	19 x 14 x 28	100	$200	$20,000 (64M) - $4 million (8G)
Vermont Research Corp. **(800) 225-9621,** **(802) 886-2256**	Pennine	Both	DEC Microvax, VAX 6000, 8000, Encore 32 series, Concurrent Series 3200	2M/5G	0.5	10M	Determined by controller	Proprietary firmware allows emulation of any drive	Unibus, Q-Bus, HPIB, SMD, SCSI, ESMD, Diablo	2	Battery, extended battery, streaming tape, Winchester disk	115 VAC	8.5 x 16.8 x 22	55	$250	$13,000 (8M) - $32,000 (128M)
	Dramfile	Both	DEC Microvax, Motorola 68000 series	8M/320M	0.5	5M	Application-dependent	All 3.½-in. and 5¼-in. drives	SCSI	2	Battery, extended battery	5 volts DC	1.62 x 5.75 x 8 (half-height), 3.24 x 5.75 x 8 (full-height)	7.5	$150	$4,140 (8M) - $47,500 (320M)
	Sierra Series	Both	DEC PDP series, MODCOMP Classic, Foxboro Fox series	5M/80M	0.5	1.2M	200	All Diablo, CDC 9427 Hawk, CDC 9742, Wang	Unibus, Diablo	1	Battery, extended battery, streaming tape, Winchester disk	115 VAC	8.5 x 16.8 x 22	50	NA	$15,000 (5M) - $21,000 (80M); One to four drives can be emulated in single unit
Western Automation **(800) 227-4637,** **(303) 449-6400**	Ramstor	Both	DEC VAX, Microvax, Motorola 68030, Sun Sparcstation	8M/320M	0.5	5M	System-dependent	SCSI drives	SCSI	7	Battery, extended battery	5 volts DC	3.24 x 5.75 x 8	7.5 (320M)	$215	$2,500 (0M) - $68,575 (320M)
X-Stor Corp. **(904) 241-5630**	X-Stor UR2 mass storage subsystem	External	DEC VAX, Prime 50, Wang VS series	64M/4G	0.864-1.59, 1.22 (average)	3.125M	1,160	All SMD devices	Unibus, Q-Bus, SMD, SCSI	2	Battery, extended battery, Winchester disk, power conditioning (all standard)	110 VAC	34 x 22.75 x 30	200	$500	$64,000 (64M) - $2 million (4G)
Zitel Corp. **(408) 946-9600**	Ramdisk/ALX, Ramdisk/ 1100, Ramdisk/ 1122, Primary Storage	External	Unisys 1100/2200, A and V series	32M-256M/ 1.2G-4G	1- 2	2M-5.33M	1,000	8470, 8480, 8481, M9720, B9494-24, 659	Block mux, Word Channel	4	Battery	115/240 VAC	61 x 21 x 33	500	$500-$1,000	$80,000 (32M) - $2,100,000 (4.1G)

SMS

FROM PAGE 70

have with SMS is the difficulty of preparing for it.

Before implementing the strategy, organizations need to analyze their use of data sets and then use various tools — such as Automatic Class Selection (ACS) routines in combination with data set names — to communicate that information to SMS.

Sterling Software's SMS/Migrator ($12,000) helps users set up systems by generating ACS routines.

Sterling also offers an umbrella product that directly competes with SMS, its Storage Automation Management System. "We can help people get started with automated storage management techniques," says Charles Keiper, senior technical consultant at the firm.

"Then, if they want to go to IBM, they can," he adds.

For $75,000, users get Sterling's Volume Allocation Manager, Data Management System, AIM, a PC-based user interface and a data compression tool.

Other vendors compete as well. Of the five major components of SMS, only one — Data Facility Product (DFP) — is an integral part of the MVS operating system. The others — DFHSM, DFDSS, DFSORT and RACF — are replaceable.

For years, people have replaced RACF with CA's ACF2. A variety of sort programs from third parties can substitute for DFSORT.

A number of alternatives are available for DFHSM and DFDSS. For example, Automatic Backup and Recovery from Innovation Data Processing can be used with DFP instead of DFHSM, and the company's Fast Dump Restore can replace DFDSS. •

ASK THE VENDOR

We are testing an SMS environment but are concerned about remote operation during disaster recovery, since SMS data sets must be restored to SMS volumes. Does Innovation's FDR/ABR DASD management software support non-SMS sites or sites that don't have enough SMS volumes to accommodate our needs?

Don Kinney
Second Vice-President
Travelers Insurance

INNOVATION DATA PROCESSING: FDR/ABR supports recovery to non-SMS environments with volume and data set backups taken in an SMS environment and vice versa. Within SMS, volumes and data sets can be restored with SMS constructs that are in effect at the time of restore. Optionally, at the time of a restore, the SMS-class information that was in effect when the backups were taken can be presented to the system's Automatic Class Selection (ACS) routines. Additionally, FDR/ABR will allow authorized users to bypass the system's ACS routines and, in appropriate recovery situations, restores can bypass the SMS subsystem itself and be directed to specific SMS or non-SMS volumes.

We use Legent's DASDMON 2.0 to provide information on DASD performance and assist with improving I/O response times. Will it work with our new IBM 3990 cache controllers?

John Melville
Manager of Systems Management
Maryland Casualty
Baltimore, Md.

LEGENT CORP.: DASDMON's measurement method can report on cache controller performance, regardless of vendor. Each I/O is measured to determine the type of request and whether the request was served from cache or DASD. DASDMON displays read-write percentages and cache hit percentages down to the data set and job level. Fast writes from the IBM 3990 controller are measured and reported.

Paths to information power

The sharpest companies know how to wield information for real advantage. How is your organization doing?

BY JACK W. SIMPSON

The global marketplace is changing — and not just because of Europe 1992. During the past few months, we've seen dramatic examples of how quickly things can change. By the time you read the daily newspaper, the political winds can shift, leaders can fall, and new governments can be installed.

By now, most information systems managers know that staying competitive in the '90s will depend on keeping up with this new change of pace: Information travels faster; opportunities come and go.

Yet, a poll taken last year by Louis Harris & Associates of New York reported that two-thirds of chief executive officers said that their companies' computer and communications resources were not properly integrated into their business operations.

Why not? Why would a company give up the advantage of real-time decision-making by operating without a sophisticated infrastructure for integrating information? Perhaps it's hard to see the big picture as it gets lost in bits and bytes and budgets.

Smart managers — those who recognize the importance of their company's information systems — will see that the answer lies in merging a company's internal data with important external information.

Merging internal and external data and the design of an information infrastructure takes a master plan. Typically, companies go through four phases in building an information infrastructure: introduction, growth, integration and power. To be successful, companies need to quickly get to the power stage — the stage at which a company sees the maximum benefit from its technology investment.

At this stage, companies also gain a competitive advantage by using internal and external information to forge decision-making links — both with its management team and with its customers, suppliers and others important to it.

In the introduction stage, a company is most likely to invest in IS machines that automate payroll, inventory and word processing. This is where computing began. Goals in this stage, such as reducing paper and increasing clerical productivity, are easily realized. However, it's hard to see the return on investment. For example, some thought that word processing would result in fewer secretaries, but most of us would agree that we've kept the secretaries and just added more computers.

Growth stage

The growth stage is a step up, but computing and information needs remain fairly simple. At this stage, the company takes on new capabilities. The art department, for instance, may produce graphics and typesetting. The marketing department may coordinate with the sales force to manage a direct mail list. These departmental applications and databases, as well as electronic mail, filing, scheduling, voice messages and portable personal computers help flatten a company's organizational structure and make it faster and more efficient.

A risk in the growth stage is that upfront costs can sometimes outweigh the near-term benefits and expectations. If promises are made and not delivered, a credibility gap occurs and the firm may cut spending before technology has a fair chance to improve the bottom line.

At this level, the manager or IS executive is left walking a tightrope. He has to make sure the company buys what it needs for today while still establishing the infrastructure for tomorrow. He needs to relate his activities to the bottom line and deliver on promises to build credibility.

Many companies today are in

Simpson is president of Mead Data Central, a Dayton, Ohio, information provider.

Four stages of information usage in Corporations

1. Introduction 2. Growth 3. Integration 4. Power

- IS can guide process
- Well-planned infrastructure is key
- Blend internal and external information

the integration stage. The driving force at this point is getting mission-critical information — the information people need to do their jobs — to each sales representative, market planner, product developer, strategist, manager and professional.

In this integration effort, the use of external information has broadened from one department to many. The critical management issue here is maintaining the completeness and the integrity of data from all departments as it's shuttled around on a real-time basis.

At this stage of integrating the internal and external information, the company will see a solid return on its investment in technology and data management. The efficient use of internal and external information will help a salesperson clinch a deal because of something he learned that morning. Marketing will act faster on segments previously undetected, or perhaps ignored, by the competition. Manufacturing can hear about problems when they happen and act while the trail is hot, or be linked to suppliers to ensure just-in-time inventory control. In addition, the sales force can be linked to customers for efficient ordering and problem-solving.

Power stage

From the integration stage, the successful merger of external and internal information will lead the firm into the power stage, which demands full-scale capture and application of external information.

The power stage delivers the broadest possible range of mission-critical information to everyone in the organization as well as to everyone important to the firm, such as customers and suppliers. Finally, in the power stage, the investment made in an IS infrastructure and the full utilization of external information can give a company the ability to react in real time.

Instead of relying on copious files of newspaper clippings, the evening news, a researcher in a library or a Freedom of Information request in Washington, D.C., a company can have the pertinent data relating to mission-critical information electronically in seconds.

Marketing managers, for example, use on-line information services for access to trade journals, newspaper articles, surveys and census figures to track trends and demographics, to stay aware of the latest issues and to find new business opportunities. Sales representatives use access to news, biography files, Standard & Poor's Register of Corporations and Securities and Exchange Commission documents to create a profile before they call a prospective client.

Information explosion

Today, research indicates that at least 80% of U.S. corporations have their information systems somewhere in the growth or integration stages. Moreover, nearly 20% of U.S. firms have fully integrated outside information services into their daily business — the power stage.

How to get from one stage to another isn't obvious or easy. It takes a chief information officer with creativity and vision and a CEO who wants the benefits of information technology and who will provide an environment for change.

In the early stages, the CIO no doubt will be walking a tightrope: Making sure the company buys the technology it needs for today, while establishing the infrastructure and architecture for tomorrow.

The best way to achieve that credibility is to have a solid plan in place, one that integrates technology into the day-to-day work flow of key decision makers and is connected to the long-term business strategy of the organization, i.e., using information to create a competitive advantage.

The CIO must chart the course and be prepared to navigate the firm through the choppy seas that lie ahead. Competition in the '90s will be fierce, stirred by the increasing speed and breadth of available information. It's up to the CIO to make sure his firm has all the data it needs to seize emerging opportunities. •

The info is better, but they miss the sound of ticker tape

BY JOSEPH MAGLITTA

It is just after 7 a.m. on Aug. 2, and the sun has barely risen over the flatlands of north-central Oklahoma. Bill Newberry pads into the near-empty 16th-floor headquarters of Phillips Petroleum Co. He sits down at a personal computer and presses a few keys. Up pops a screen filled with the latest news of the Iraqi invasion of Kuwait that began only hours before.

Halfway across the nation, Martha Moore is busily preparing an electronic "morning newspaper" for employees at a Digital Equipment Corp. engineering facility in suburban Boxboro, Mass. In less than one minute, carefully selected items are zipped across a company network to more than 100 users.

As U.S. organizations become more adept at delivering information to employees, tastes in information have begun to change. Information consumers are getting pickier.

"Originally, people were so thrilled to get information. We'd give them an info-dump, and they'd happily wade through it," says Moore, who is manager of information systems at one of DEC's 18 official corporate libraries. But, she says, it has become clear that "as people get increasingly information savvy, they don't want to wade through all that stuff."

A novel approach

The notion of "information overload" is hardly news to any busy professional whose desk is stacked high with newsletters, magazines, newspapers, reports and other items.

What is novel, however, is how organizations are tackling the problem. A small number of major corporations — including Lotus Development Corp., Prime Computer, Inc. and NEC Technologies, Inc. — have begun to employ various information-sorting systems that use sophisticated artificial intelligence, filtering, "knowledge agents" and FM transmission to help users make sense of the information blizzard.

While the technological approaches vary, the purpose is the same: Screen out all unwanted information and mine only what's usable.

Phillips Petroleum and DEC are good examples of how companies are using technology to satisfy finicky, information-hungry users.

Throughout the day on Aug. 2, and for days afterward, one of the hottest spots outside the Persian Gulf was a PC located in the Phillips corporate affairs department in rural Bartlesville, Okla.

The PC is a dedicated terminal for News Edge, an information screening service sold by Desktop Data, Inc. in Waltham, Mass. Feeds from major newswires are beamed to a rooftop satellite dish, which feeds into a special PC. Special software looks for predetermined keywords and places desired items in an "alert" database.

During the invasion, Phillips public relations staff "used News Edge and Cable News Network all day to monitor the Gulf," says Newberry, a communications systems analyst.

Even on normal days, Newberry says, staffers check the system approximately every 30 minutes to catch alerts on oil spills, stock and oil prices, new legislation and other hot topics affecting company operations.

Installed last May, News Edge replaced a single Dow Jones News/Retrieval service wire, known as a "broad tape." Now, instead of paper tapes spilling onto the floor, a single PC gives the latest information from Dow Jones, the PR Newswire, Comtex Scientific Corp., United Press International, Knight-Ridder, Inc. and Reuters.

It costs about $500 to $600 per month to run the system, according to Newberry, who says it's worth every cent. While the cost is expensive for one terminal, it's a bargain as more are connected, he says.

The biggest and most obvious benefit is that users from three departments get more and better news faster.

The Gulf conflict wasn't the first time that the system had paid for itself, he adds. During the system evaluation, Phillips monitored News Edge to learn the location and time of a federal press meeting called in the aftermath of an October 1989 explosion of a Phillips Petroleum chemical complex that killed 19 people.

About the only drawback, Newberry says, is the Oklahoma weather. "Thunderstorms mess up the satellite reception and cause small glitches that make the system beep. But the data comes in pretty readable; there's no garbage."

David Leifer

DEC's Moore *needed a way to streamline information gathering and dissemination*

But Newberry wasn't prepared for another surprise: Information vendors demanding big rate hikes. "We have experienced wolves at our door wanting to increase prices," he says. For example, Reuters wanted to raise the per-terminal price from $25 to $625 per month, but after negotiations, agreed to keep the original rate, Newberry says.

Hit with users

Does the system get used? "If [users] are looking for anything, they usually come here first," Newberry says. In fact, he says that News Edge has been such a hit that Phillips is considering adding it to the company's executive information system as well as making it available, via network, to 250 other users. "The one thing users miss is the noise from the broad tape [ticker tape]."

At DEC, Martha Moore had a simple reason for wanting a customized information service. "I just wanted to get information out to people without killing myself," she explains.

As the main information provider for some 1,200 DEC employees, Moore often found herself spending up to eight hours a day gathering and abstracting information for internal distribution. "It was crazy," she recalls.

During a search for possible solutions, she found First, a news gathering and disseminating tool developed by Individual, Inc. in Cambridge, Mass. Based on AI technology developed by Cornell University, First is sold based on the number of stories desired and a flat rate for distribution rights. The company says that daily service for 200 managers costs about $50 per person per year.

A trial system was installed in November 1989, and Moore was quickly sold. "The newswires are good, but it's awful hard to get information out of there without getting a lot of garbage. Now, I get exactly what I need and nothing more," she says.

First evaluates the relevance of information presented to it, then locates, filters, refines and transmits customized news via MCI Mail or other channels. Information is stripped down to the barest essentials: Readers receive only four to six carefully selected articles per day from six major newswires. Users get only the information that interests them.

"News comes right off the newswires at 3 a.m. When I come to work at 8 a.m., we look at the news and throw it out to a distribution list of about 100 people. It literally takes a minute."

Moore says First is cheaper to use on a regular basis than Dialog, Lockheed Corp.'s popular on-line product, which is still used to search for technical journal articles.

COMPUTER INDUSTRY

NATIONAL
BRIEFS

Empire of the Sun

AT&T is about to up its stake in workstation maker **Sun Microsystems, Inc.** in a deal that will net Sun an estimated $192 million, the companies announced recently. Under an outstanding agreement, Sun has the right to issue new shares in an amount up to 15% of its outstanding stock and sell them to AT&T. If the deal closes, the communications giant will emerge as 14.7% owner of Sun, based on shares acquired from Sun itself.

■

Everybody's all-American

A year ago, **MRS Technology, Inc.**'s flagship product line — a panel printer specifically geared to the manufacture of color active-matrix LCDs — was a big deal in Japan, but, according to MRS President Griffith Resor, the firm could barely scrape a deal on home turf. With increasing attention focused on the flat-screen technology enabled by MRS, however, that could change. Witness the recent $1.5 million deal that will land the firm's products in a bastion of U.S. technology: **IBM**'s **Thomas J. Watson Research Laboratory.**

More briefs on page 81

Laptops beget laptops — and fast

Toshiba uses its own products to speed production in an age of short shelf life

BY LORI VALIGRA
IDG NEWS SERVICE

Trendy laptop computers are fast gaining market popularity, but the almost equally speedy end to their shelf life presents a big challenge to their makers: how to design, manufacture and get a product out the door so it will not be stillborn.

"If a product isn't developed and put on the market quickly, competitors will release their own versions, and the life span of the product still under development shortens drastically," said Masao Suga, who heads the personal computer research and development department at Toshiba Corp. in Tokyo. "Often it's the case with some products that the effective life span is already over by the time it goes to the marketplace."

Japanese companies such as Toshiba have created their own dilemma as they strive to stuff more technology into ever smaller packages. Luckily, they have a strategic advantage: their particularly sophisticated manufacturing ability.

For Suga, who is employed at Toshiba's Ome design and manufacturing works west of Tokyo, factory automation and product development go hand-in-hand: Ome uses Toshiba J3100 laptops for design, development and assembly of its own new products.

For example, it uses the laptops in the design stage to determine how easily the product can be manufactured. The J3100 laptops are linked using two local-area networks: Novell, Inc.'s Netware and Toshiba's proprietary 10M bit/sec. Ethernet-compatible network. Thanks to this setup, it now takes only a few minutes for an assembly line of 12 workers at Ome to slap together a notebook-size Dynabook.

Toshiba *uses old and new to quicken market reflexes*

The decision to automate the Ome plant was an easy one, based on a new business focus for Toshiba. Automated lines in the 22-year-old, 75,000-square-meter plant, which turns out a wide range of data processing products, were first installed in 1984. This was in preparation for a move Toshiba hoped would be a big business: its 1985 entry into the laptop market. The company now makes around 1 million laptops per year at Ome.

"We decided to automate in 1984-1985 because we wanted to introduce laptops and have advanced equipment for producing them," Suga said. Robots used initially proved too inflexible to accommodate the short product life cycles, which range from six months for Japanese word processors to about three years for laptops.

Toshiba laptops currently on the market serve as the basis for new versions, with 70% of the design work from current models replicated in the new. The 30% novel design includes integrating the latest technologies, such as more compact floppy disk drives. This ratio also holds for laptop components.

"By using laptops and central databases, not only can the 30% of the original design be carried out, but any previously performed relevant material can be easily found and accessed," Suga noted. This economy, he said, assures that the latest design continues to follow any design methods or standards that have been set.

"The use of laptop computers is the key to Toshiba's efficient design," Suga said. Affecting a quick design turnaround keeps Toshiba from falling into a trap he termed the "desperate development cycle" in order to remain competitive.

Continued on page 81

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COMMENTARY

Rosemary Hamilton

The CASE for AD/Cycle

Only IBM can go from being on the outside to being at the very center of a market in a matter of months. Take a look at the computer-aided software engineering (CASE) market these days.

Users seem to be taking IBM's entry into the CASE market in stride. Information systems managers contacted recently said several factors go into making a CASE product selection, but where a company stands in relation to IBM does not top the list.

Nonetheless, it is nearly impossible to find a company that does not in some way position itself around IBM and its CASE offering, AD/Cycle.

Just one year ago, the CASE industry consisted of dozens of companies offering different products and approaches for software engineering. Their greatest problem, perhaps, was to gain more of an identity with corporate buyers.

Now that IBM's AD/Cycle is in the picture, there are no identity problems. While some vendors such as Index Technology have aligned themselves with more than one CASE partner, the view of the majority is clear: Companies cannot help but position themselves in some way with AD/Cycle.

Many users claim to focus more on a CASE vendor's products and how they fit into the user's plans than on that vendor's business partnerships.

However, the vendors seem intent on selling those advantages to users anyway.

This game began in September 1989 when IBM introduced AD/Cycle. In a sense, it ushered in a class system for the CASE market.

With AD/Cycle, IBM set up an inner circle of three business partners and a second tier of a few dozen, less-connected companies. Beyond that — well, each company was on its own.

The inner circle includes Index Technology, Bachman Information Systems and Knowledgeware. Recently, IBM added a fourth partner, Synon, but the circle remains a tight, elite group. The second tier consists of most other players in the CASE market, some of whom offer products that directly compete with AD/Cycle.

Perhaps the most important advantage of inner circle life — even beyond having IBM as a stakeholder and co-marketer — is the right to sit on the committees that are crafting AD/Cycle.

> THIS GAME BEGAN in September 1989 when IBM introduced AD/Cycle. In a sense, it ushered in a class system for the CASE market.

For example, a major piece of AD/Cycle is the Repository Manager information model. In essence, it is the key to AD/Cycle in that it consists of the rules and guidelines that will govern this eventually integrated application development environment.

Inner-circle members work with IBM at establishing those rules and guidelines. It is their combined efforts that produced the first bare bones information model, which was released in June.

"We have the inside track and, I would venture to say, a much deeper level of understanding of the technology than the others will have," said Arnold Kraft, president and chief executive officer of Bachman.

Inner-circle companies claim that, unlike the second-tier members, they have a say in what AD/Cycle will be.

While the second-tier companies have to wait for IBM to release AD/Cycle specifications to modify their products to be compliant with it, the inner circle is right there creating it.

This has two rewards: Their products will be a more integral part of AD/Cycle, and they will be able to deliver AD/Cycle-compliant products more quickly than the second tier.

The second tier claims that the key is to tie into the IBM Repository, period. Since IBM will make specifications public, then all CASE providers, regardless of their relationship with IBM, will eventually provide AD/Cycle-compatible products.

While they acknowledge that the inner circle will have a six-month to one-year lead time on them, they also suggest this: A six-month to one-year lead time isn't critical when it comes to CASE because many customers plan to implement tools slowly over the next few years.

Furthermore, they assert that if a user desperately needs a full-blown CASE environment today, they can provide it now and then migrate users to the Repository Manager later. An inner circle company cannot do that.

In the end, though, the advantages that the companies promote are unlikely to sway the users.

"Those [users] who are essentially Blue and who want to implement AD/Cycle and are prepared to take the time neccessary to let AD/Cycle evolve will clearly tend to favor the inner four," said Vaughan Merlyn, chairman of CASE Research.

"The shops that are interested in more short-term results who will value solutions that are here and proven today will value those [IBM] relationships much less," he said.

Hamilton is *Computerworld's* senior editor, systems and software.

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Daisy chained to sunken fortune

Landed in bankruptcy court, Daisy now requesting time to reorganize

ANALYSIS

BY J. A. SAVAGE
CW STAFF

SUNNYVALE, Calif. — Daisy Systems Corp., now in the hands of the bankruptcy court [CW, Aug. 6], is in danger of adding another epitaph to the expanding technology company graveyard.

Singled out as a beacon of entrepreneurship by President Reagan in 1983 when it increased its revenue from $7 million to $25 million in one year, Daisy began falling to earth in the mid-1980s.

The crash came when the company, already weakened by its inability to adapt to open systems rapidly enough, plunged into the costly, hostile acquisition of a company that, once won, proved costly and hostile to assimilate, analysts said.

Daisy began making the Logicon series — workstations with proprietary graphics chips and a proprietary operating system — in 1981. The company aimed its systems at the computer-aided engineering market, specifically in the area of chip design.

An attempt at expansion in the mid-'80s brought the first hint of trouble to the then-high-flying firm.

"They tried to port software over to Digital Equipment Corp.'s platform," said analyst Robert Herwick at Hambrecht & Quist, Inc. in San Francisco. Once there, he said, Daisy "discovered a total lack of discipline and documentation, which led to unportable software."

In 1986, Daisy laid off 10% of its 1,000-person work force. At the same time, eight investor suits were brought against the company, charging it with misrepresenting its financial condition from the time it went public in 1984.

Despite its problems, in 1988 Daisy set out to acquire Cadnetix Corp., a Colorado maker of turnkey systems for printed-circuit board layouts.

When Cadnetix refused Daisy's offer, Daisy bought it in a hostile takeover and eventually moved its entire operations to Colorado under the name of Dazix. The Daisy name, and the holding company that bears it, remained in California.

The costly and psychologically formidable task of integrating Cadnetix into the Daisy fold and Daisy into the Cadnetix home base had to be undertaken by people who were unhappy about where they were, unhappy about what they were doing or both, Herwick said. At that time, Daisy had targeted Sun Microsystems, Inc. as its platform and was the first licensee of Sun's operating system. It marketed the system under the name Advansys series.

The pace of gloomy activity picked up late last year, after Daisy announced a $140 million annual loss. Its chairman and chief executive officer, Norman Friedmann, resigned in December 1989.

He was replaced by Gary Sbona, the founder of Regent Pacific Management Corp., "to assist the company with regard to its current financial problems," according to a statement made at the time.

Sbona did not return *Computerworld*'s calls, but a statement issued by the company said that he would continue as CEO.

Just prior to Friedmann's leaving in December, the company refused to pay the most current interest payment and other fees to its senior lender, Heller Financial, Inc. Daisy is currently in default under terms of its loan agreement.

In March, the company laid off more than 100 people. By May, Daisy's creditors had run out of patience. A group of them hauled the struggling firm into federal bankruptcy court.

In court documents, four creditors other than Heller are listed as having a total of $11.5 million in bonds. Herwick estimated that Heller is holding another $37 million. An attorney for Heller said the company would not discuss Daisy and would not confirm the number. Other creditors have been named, but without specific denominations of the debt.

As an alternative to the involuntary bankruptcy, Daisy petitioned the court two weeks ago to give it a chance to reorganize under Chapter 11 of the Bankruptcy Code. The firm said that the reorganization it hopes to try would necessitate a "substantial reduction" in its work force.

In its reorganization plans, Daisy said that it will establish an independent international group with software and technology licensed to the group and royalties paid back to the U.S. companies. According to a statement, it will also seek a buyer for Dazix, "hopefully as a whole, but if not, in parts."

Herwick did not blame Daisy's new management for its troubles. "It was too little, too late. It would've taken a miracle," he said.

> THE COSTLY AND psychologically formidable task of integrating Cadnetix into the Daisy fold and Daisy into the Cadnetix home base had to be undertaken by people who were unhappy about where they were, unhappy about what they were doing or both.

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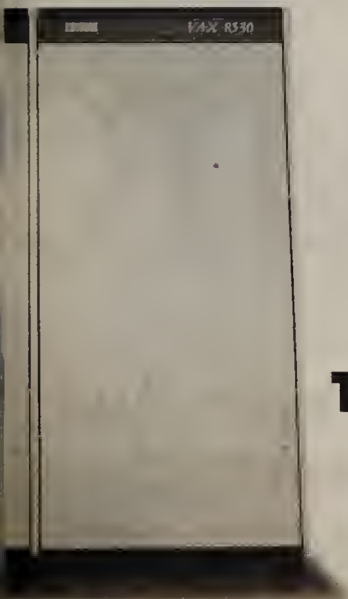

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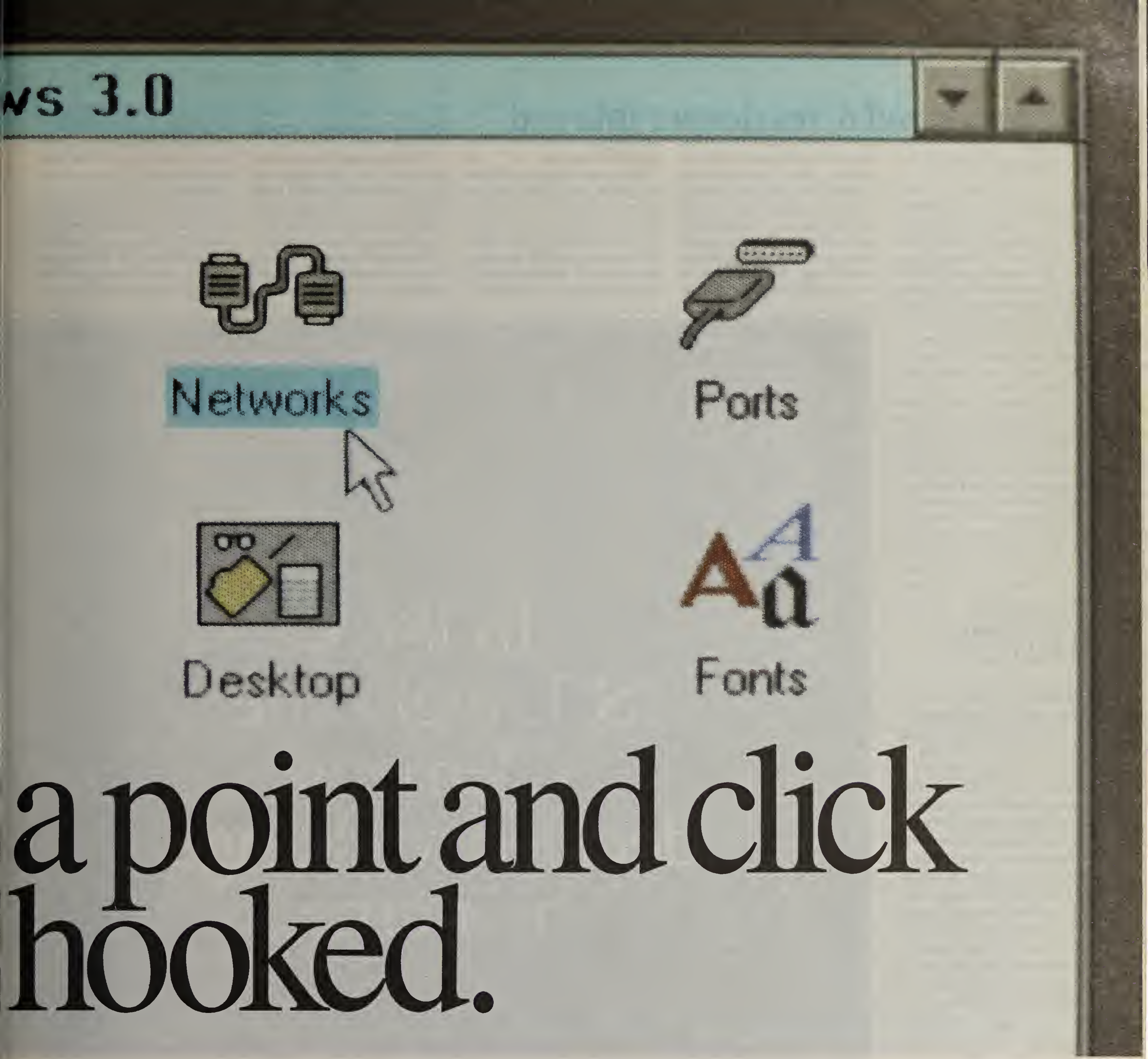

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Businessland dives deeper into red

BY RICHARD PASTORE
CW STAFF

SAN JOSE, Calif. — Businessland, Inc.'s financial frying pan got a lot hotter last week when the computer reseller announced quarterly and fiscal-year losses exceeding $21 million. The firm also reported that, because of accounting errors, it underrepresented its losses in the previous two quarters and is now in violation of certain creditor terms.

The company posted a fourth-quarter loss of $21.5 million on revenue of $339 million, compared with income of $7 million and revenue of $322.6 million in last year's comparable quarter.

Businessland closed out its 1990 fiscal year with a net loss of $23 million and sales of $1.4 billion. The loss included a $6 million restructuring charge related to store closings and layoffs late last year. This is Businessland's first fiscal-year loss since 1986.

The company blamed the negative figures on lower operating margins, increased spare parts inventory and operating losses from its international business and Computercraft consumer retail outlets.

Businessland began to trickle red ink in the fourth calendar quarter of 1989, when it reported a $1.2 million loss and announced a layoff of 5% to 7% of employees. In reality, the situation was even grimmer than it appeared. Recent adjustments for accounting errors almost doubled the previously reported $1.2 million loss.

The losses place Businessland in violation of terms with creditors who hold $50 million in senior notes. The company said it is currently in contact with its lenders concerning the violation.

The reseller announced a recovery strategy in January that included aggressive overseas expansion. It also vowed to roll back discount points to fight the downward pressure on profit margins and increase its offerings and pricing for support and services.

Resellers such as Businessland were responsible for more than 60% of all personal computers sold in the U.S. last year, according to International Data Corp. in Framingham, Mass.

INTERNATIONAL BRIEFS

Not just for PCs

In line with a national effort to establish Taiwan as a force to be reckoned with at the higher end of the computer industry, Taipei-based **Fora International** has acquired **Micro Marketing International, Inc.**, a Pennsylvania-based direct-marketing firm, to expand its sales channel in the U.S. The deal, valued at approximately $10 million, is Fora's second such in two years; last year's catch was **Dyna Micro, Inc.**, a distributor with offices in Los Angeles and Houston.

◆

New kid on the bloc

A German/Hungarian joint venture launched last year got high marks from its German partner earlier this month. Munich-based **Montana Computer Consulting** noted satisfaction with the first fruits of **Montana Szamitastechnikai Tanacsado es Szolgaltato Kft.**, a software development firm formed by Montana Computer and a consortium of Hungarian private investors. In addition to contributing 50% of the startup funding, Montana Computer is shipping PCs, printers and optical character recognition equipment to technology-hungry Hungary. Plans for the joint venture firm include a move into the Japanese market.

In 1863,
S. Langhorne
Clemens
decided to change
his name.

Toshiba

FROM PAGE 75

The computers are put to work as part of the so-called Variety Reduction Program popular among manufacturers in Japan. The program's popularity stems from its track record: While it took Toshiba three years to develop the T3100 and J3100 laptops from scratch, it took only nine months to design the Dynabook.

In the U.S. and other countries, technology on the factory lines traditionally has been greeted with fear and confusion by workers. Not so in Japan: The Japanese government's industrial drive, along with rapid adoption of factory automation systems at major companies such as auto makers, has made automation a household word. Toshiba has 2,000 full-time employees at Ome, 70% of whom are engineers. Each engineer has an average of 1.5 Toshiba J3100 laptops to use. "So there were no 'people problems' in introducing the technology," Suga said.

The factory is about 70% to 80% automated, he said. Visitors to the company often comment about the number of people still present on the manufacturing lines, but Suga said that with the fast-paced product life cycles, humans are needed. "There are problems with automated systems. They can't catch up with new technology, so humans are acting as universal super robots," he added.

Along with using the networked laptops for product development, assembly, employee training and administrative work, Toshiba ties the LANs into a network that links the firm's head office with other Toshiba outposts and departments, as well as with parts and equipment suppliers.

For example, using the laptops, Toshiba can communicate with suppliers to order hard-to-get advanced technology parts such as dense memories and gate arrays. "It's hard to get parts for our products. We must order them three months in advance," Suga said. This is part of the well-known "kanban," or just-in-time system, used in Japan to keep production and inventories in line with customer demand.

Toshiba plans to link its factories into the $33 million global digital network it is setting up throughout its 220 locations in 36 nations. The network, scheduled to be cut over in December 1991, will support high-speed Group III and IV facsimile transmissions, store-and-forward switching systems, electronic mailboxes on personal computers and engineering workstations and data communications.

NATIONAL BRIEFS

Diehard

Wall Street, gone awry in reaction to escalating uncertainty in the Mideast, is proving a particularly hostile environment for technology stocks. None of that, however, seems to be getting to **Micrografx, Inc.** Last week, the application software vendor announced that it would be numbered among the firms included in the newly expanded NASDAQ National Marketing System. The move will increase the access of stockbrokers and market makers to up-to-the-second stock information.

■

Romancing the stone

San Diego-based **Emerald Systems Corp.**'s acquisition of Longmont, Colo.-based **Digital Storage Systems, Inc.** for an undisclosed amount of cash and stock gives Emerald pioneer status as a network backup and restore supplier entering the real-time, continuous backup market. The purchase of Digital Storage Systems, an early developer of continuous backup software, comes one month after 6-year-old Emerald secured $6.5 million in a third round of venture capital financing.

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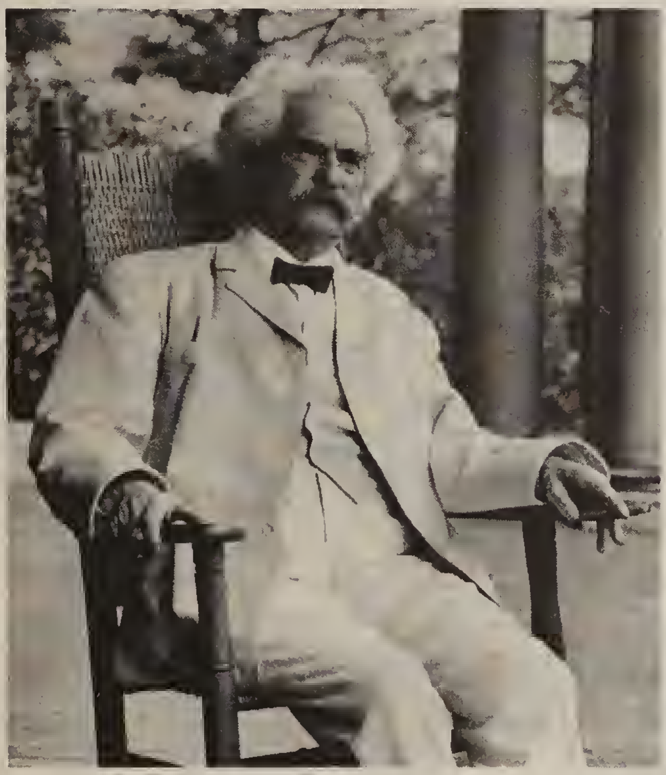

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CW0813

Creating your own promotion

With enough initiative, you can write yourself a new job description

BY JILL VITIELLO
SPECIAL TO CW

At many firms, downsizing and belt-tightening have knocked some rungs out of the traditional corporate ladder. As a result, ambitious information systems professionals need to find new ways to get ahead.

One route they can take is to create a promotion for themselves by writing a new job description. However, they had better go about it the right way.

Sometimes writing your own job description is the only way to get a promotion, says Marilyn Moats Kennedy, author of six books on career planning and managing partner at Career Strategies, a consulting firm in Wilmette, Ill.

The experience of one telecommunications analyst illustrates the process. A leading consumer products firm hired him two years ago to troubleshoot telecommunications problems for users. Because he was interested in local-area networks and personal computers, he volunteered to work in those areas, too.

Among other initiatives, the analyst recommended and implemented the replacement of LAN control units with PCs, which are faster and can handle six times as many users. The move is expected to save the company about $40,000 over three years.

The analyst earned recognition and respect from his boss by going beyond the requirements of his job. At his annual review, his boss suggested that he deserved a promotion but indicated that there was no appropriate job slot.

That's when the two decided to rewrite the analyst's job description to upgrade his position. Working from the current job description, they created an entirely new one that added responsibilities such as standardizing procedures, controlling expenses and managing projects.

"We knew the company was hot on innovation and expense control," the analyst says. "My boss and I created a job that highlighted those skills in order to get it approved."

The plan worked. The analyst and his boss won the approval of the director of information services, who handled negotiations with the human resources department. The telecommunications analyst was named senior network analyst and got a raise commensurate with his new job grade.

Creating a new job description has its risks, but handled carefully, they can be well worth the rewards of a new position and a fatter paycheck. Here are three guiding principles:

1) Make sure your timing is right. For the approach to work, you must show that your initial duties have evolved into different, more demanding responsibilities, says Janice Gaccione, managing partner at MacLean Associates, a compensation consulting firm in New Hope, Pa.

In most companies, a job grade is associated with a salary range. If you're doing great work but handling the same responsibilities you were hired to take on, you should aim for a raise within your present salary range. Usually, a promotion is appropriate only when your responsibilities have grown enough to bump you up to a higher job grade.

A PC administrator who has been servicing three departments and is asked to handle two more is still doing the same job, although there is more work. A PC administrator who is asked to supervise all the PC administrators at the firm is stepping into a new role — managing others.

Make sure you offer proof in your new job description that you are actually doing the work typical of a higher position. It may help to study descriptions of jobs one and two grades above you or to read surveys of jobs and salaries in trade publications.

2) Don't do an end run. Enlist the support of your boss. Without it, you don't stand a chance. "If you go to your boss' boss, you create problems," Gaccione says. Your manager is responsible for determining your position's worth; it's unlikely that a manager at a higher level would differ with his judgment.

> SOMETIMES WRITING YOUR own job description is the only way to get a promotion.
>
> MARILYN MOATS KENNEDY
> CAREER STRATEGIES

Don't go to the human resources department without your manager's approval. "You might as well start looking for a new job," Kennedy says. Human resources departments don't work with individuals for their own benefit. They have guidelines to maintain and will allow changes in job descriptions only with the manager's permission.

3) Target company needs. The analyst saw the need for a LAN expert on staff and set out to become the local LAN guru. His effort showed foresight as well as initiative.

It is particularly important to identify the characteristics your company values. Typical factors include education, experience, skill level, problem-solving ability, complexity and variety of duties, customer contact and leadership. If your company prizes the ability to win customers, for example, emphasize any increase in customer contact associated with the new job.

"Your job description should emphasize what you are being paid to achieve rather than present a list of tasks," Gaccione says. Like the analyst, demonstrate how your work benefits the company by helping customers, saving money or generating profits.

A final word of caution: Don't discuss the change as if it were a well-deserved promotion. The days of the paternal corporation have passed. "There are no entitlements in today's business environment," Kennedy says.

It isn't impossible to get a promotion in a corporation that has gone from pyramid to pancake. It just takes more planning and creativity than ever before.

Vitiello is a speech writer and freelance journalist based in East Brunswick, N.J.

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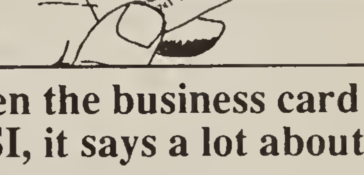

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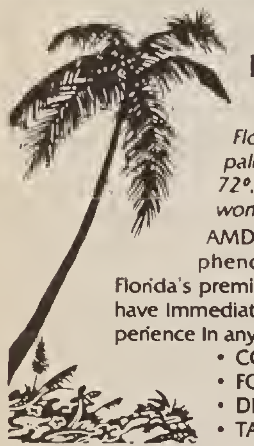

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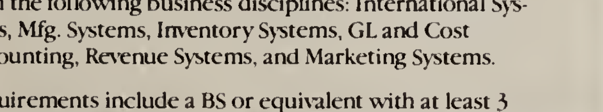

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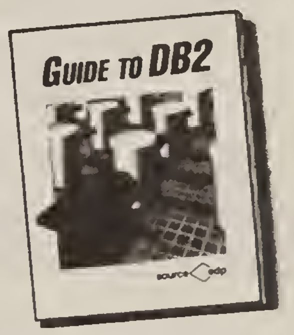

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MARKETPLACE

Dealers grapple with new PCs

Sophistication of hardware and software puts a premium on service

The increasing power and sophistication of personal computers and the critical nature of the applications the machines can support are changing the way vendors and dealers sell PCs.

The Systempro from Compaq Computer Corp. illustrates the growing complexity of the machines. Often used as a network server, the Systempro can run two processors and two operating systems. The high-end model sells for as at a list price of as much as $29,999. "It really challenges the definition of the personal computer," says Dan Ness Jr., a microcomputer industry analyst at Computer Intelligence, a market research firm in La Jolla, Calif.

The Systempro stands at one end of a polarized PC market. While the high-end machines take on the character of a minicomputer or workstation, the low-end models are treated more like a commodity.

As rock-bottom prices and sophisticated service become more critical, dealers must move in one direction, says Susan Yamada, an analyst at Merrin Information Services, Inc. in Palo Alto, Calif. They must either be "box pushers" marketing on the basis of price or "boutiques" offering more specialized support than in the past. "In the long run, anyone in the middle is not going to be around," Yamada says.

Businessland, Inc. is trying to adjust to the market. It has positioned its Computer Craft division to sell low-end PCs and its Advanced Products division to market high-end systems. "Businessland is trying not to focus on price and stress value-added sales," Yamada says. Last week, the company posted a $23.1 million loss for its fiscal year and its stock dropped 58%.

Computer Intelligence examined the sources of revenue for different types of resellers to gauge their ability to support complex PC systems (see chart). Buyers interested in a long-term relationship with a reseller should identify the ones that emphasize continuing support and avoid "fire sales," Ness says.

Vendors, meanwhile, are trying to help dealers sell the more complex PCs. Compaq has opened four demonstration centers to which dealers can bring customers. The firm is also helping chain stores that sell its computers recruit local-area network consultants and other specialists as franchisees.

"It's a different sell," says Mike Berman, a Compaq spokesman. "There's a longer evaluation process. Depending on what the dealer's business is, it will have to make some adjustments."

IBM and Apple Computer, Inc. are helping dealers cater to customers in niche markets. They offer cooperative marketing funds and training to encourage dealers to sell specialized software and services to customers in specific industries.

Ness suggests looking beneath the surface of such arrangements to examine the dealer's willingness and ability to support a particular application. Get references from other customers, he says.

DAVID A. LUDLUM

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The channel

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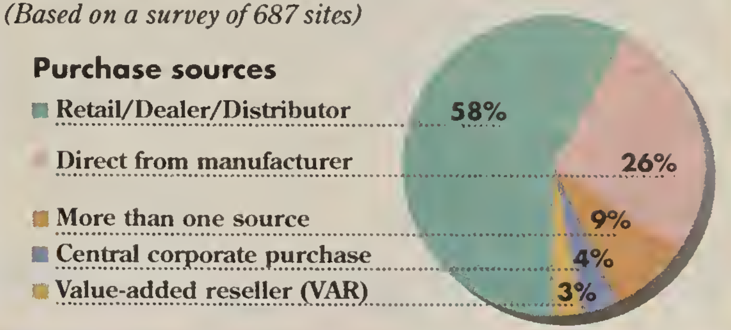
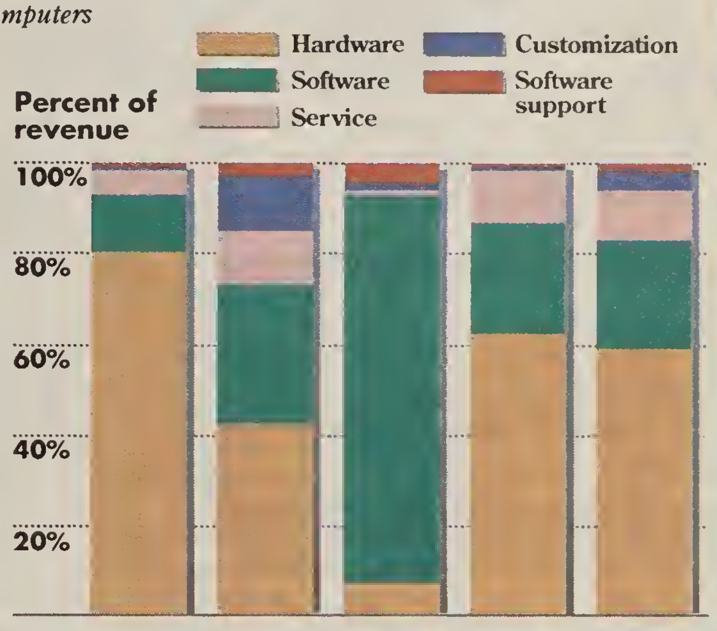


What they do

Value-added resellers are more accustomed than other suppliers to providing services called for by more complex personal computers



Source: Computer Intelligence

CW Chart: Paul Mock

Buy/Sell/Lease

The BoCoEx index on used computers

Closing prices report for the week ending August 3, 1990

	Closing price	Recent high	Recent low
IBM PC Model 176	$400	$660	$250
XT Model 086	$500	$700	$350
XT Model 089	$650	$825	475
AT Model 099	$1,050	$1,375	$475
AT Model 239	$1,125	$1,325	$700
AT Model 339	$1,375	$1,400	$900
PS/2 Model 50Z	$1,650	$2,000	$1550
PS/2 Model 60	$2,500	$2,600	$2,400
Compaq Portable II	$975	$1,150	$875
Portable III	$2175	$2,500	$1,900
Portable 286	$1,400	$1,675	$1,300
Plus	$675	$750	$650
Deskpro	$825	$900	$800
Deskpro 286	$1,400	$1,625	$1,300
Deskpro 386/20	$2,800	$3,100	$2,700
Apple Macintosh 512	$375	$775	$275
512E	$450	$450	$350
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Teaching presentation skills

Training must show that it is how the message is conveyed that counts

BY JESSICA KEYES
SPECIAL TO CW

There are an estimated 11 million meetings held across the country every day, according to Edward Scannell, past president of the American Society for Training and Development. As a result, the chances are that someday an unsuspecting member of your staff will be asked to make a presentation.

Inside an information systems organization, these presentations can be quick and informal affairs, replete with jargon and chalkboard scribbling. However, as IS professionals move out into business units or fight harder for scarce budget dollars, training organizations must equip them with good presentation skills.

Research findings underline the challenge. People listening to a speaker judge the talk on three attributes: content, the speaker's appearance and his delivery. Content isn't the most important factor. The weighting is more like 8% for content, 42% for appearance and 50% for the way the speaker conveys his message — his enthusiasm, for instance. It's not what he says as much as how he says it.

A lot of people develop severe stage fright when confronted with an audience. Sending them to a class cures the jitters most of the time. People who overcome the problem learn exactly what causes the nervousness, along with some physical and mental techniques to combat it. They include the following:

Know your audience. This consideration may be the most important. A surprising number of IS people make the mistake of delivering the same presentation to senior managers that they would put on for their peers. Presentations must be tailored to the audience. Think of the way IS people design executive information systems: They are quick and easy to use, reflecting the technical abilities of senior managers and the constraints on their time.

Peg the presentation to the time of day. Success can depend on when a presentation is given. The best time is early in the morning, as long as the presenter is energetic and the presentation is full of momentum. Right before lunch is the easiest time to give a presentation; people may be ready for lunch, but they tend to be most alert then. Presentations after lunch suffer from sleepy, overstuffed audiences. A presenter who speaks at 4 p.m. must be mesmerizing.

Warm up the audience. Giving a presentation involves more than speaking in front of a group of people. It calls for working the audience, too. Right before his talk, the presenter should meet and greet as many people as possible. The members of the audience will be more comfortable, and the speaker will avoid standing awkwardly while they gather.

Organize the talk. A presentation has an introduction, a body and a conclusion. While this point may seem obvious, it's an important one to emphasize because presenters often fail to order their thoughts coherently.

The conclusion is the easiest part. It sums up the idea the speaker wants the audience to buy into. The introduction and the body are more difficult. Experienced speakers learn to make power openers: They use the first few moments, when they have everyone's attention, to dramatize their point, often with anecdotes, examples, evidence or statistics. It takes practice to get good at it.

It also takes practice to organize facts logically into the body of a presentation. It's important to get them all in, put them in a logical order and anticipate questions that may arise.

Use body language. As the research suggests, appearance, style and manner of speaking are crucial. Specific considerations include the need to dress appropriately, project your voice, use effective phrasing, employ humor, make eye contact, maintain good posture and emphasize points with facial expressions, gestures and body movements.

Control the environment. There are too many presentations to senior managers where 10 people squeeze into a cubicle for an on-line demonstration. One problem is that no one quite sees the action on the tiny screen. Another one is that the system can go down, sinking the presentation with it. Even if that doesn't happen, most presenters are nervous enough without worrying about the vagaries of a demonstration system. If it's feasible, I demonstrate a system using 35mm slides of screens or a computer slide show.

Presentation devices also help when staff members need to convey facts and figures while demonstrating a system. Additional devices to consider include overhead projectors, computer graphics, multimedia programs and video camcorders.

There's another reason IS organizations should teach staff members these techniques: It's often said people retain only 10% of a verbal presentation after 10 days while they remember 65% of a demonstration.

It takes a savvy IS manager to understand the value of teaching staff members the tricks of the presentation trade. The manager should also keep in mind that while these skills can be taught, it takes coaching and practice for staff members to learn them.

Keyes is president of New Art, Inc., a management and computer consulting firm in New York.

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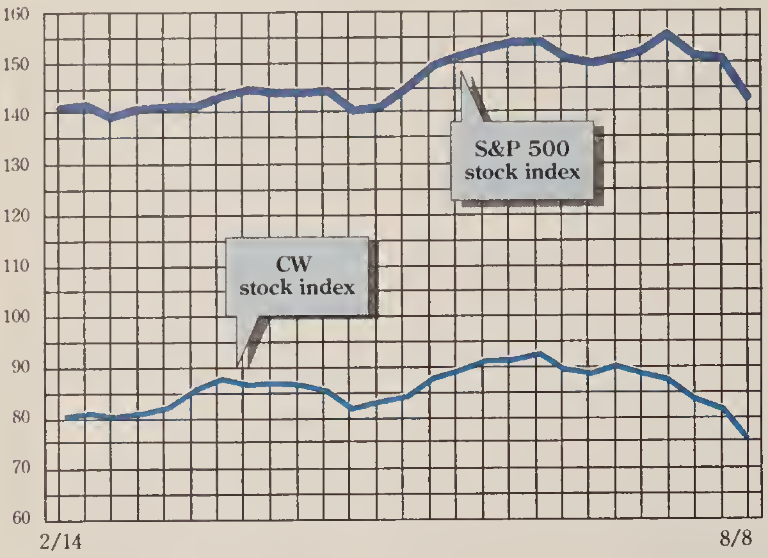

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Communications	116.7	**110.4**
Computer Systems	79.3	**75.2**
Software & DP Services	117.7	**107.5**
Semiconductors	53.3	**48.9**
Peripherals & Subsystems	89.9	**85.0**
Leasing Companies	71.8	**62.2**
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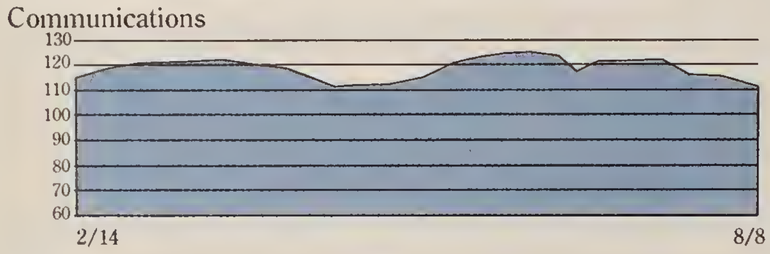

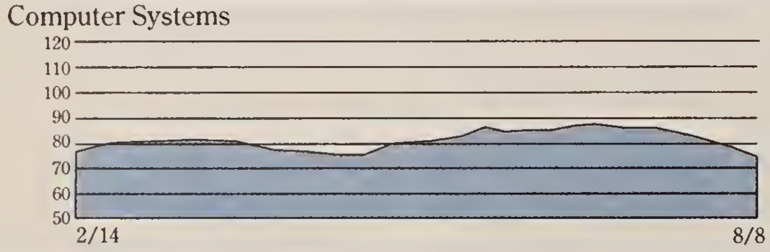

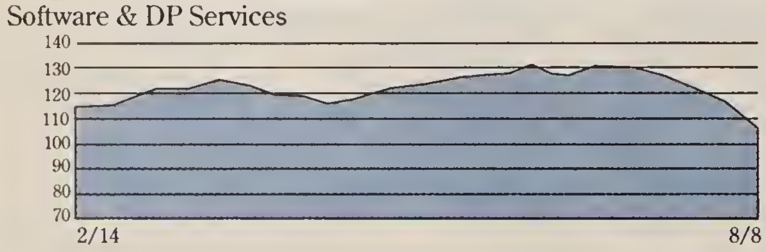

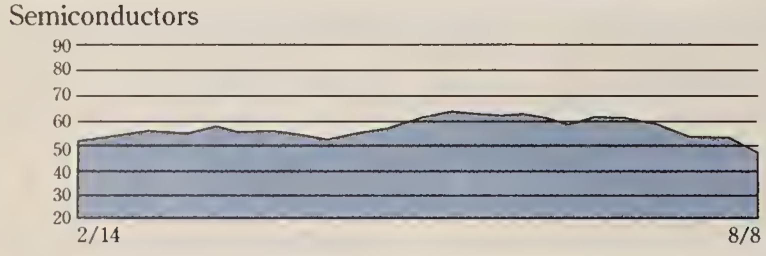

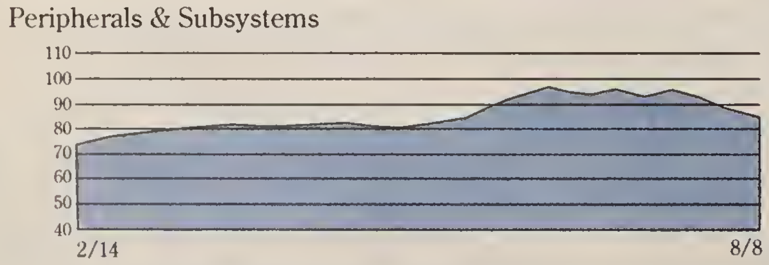

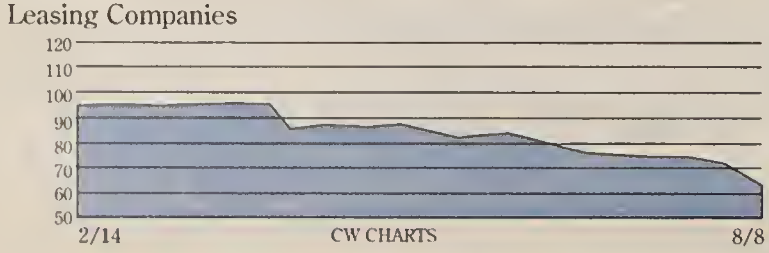

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CLOSING PRICES WEDNESDAY AUGUST 8, 1990

Communications and Network Services

EXCH		52-WEEK RANGE		CLOSE AUGUST 8, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
		PRICE				
N	AMERICAN INFO TECHS CORP	68	55	60.125	-1.5	-2.4
Q	ANDREW CORP	26	17	17	-2.3	-11.7
Q	ARTEL COMM CORP	10	3	3.5	-0.5	-12.5
N	AT&T	47	34	35	-1.8	-4.8
Q	AVANTEK INC	7	2	2.875	0.0	0.0
N	AYDIN CORP	21	13	13.25	0.0	0.0
N	BELL ATLANTIC CORP	57	43	46.5	-3.4	-6.8
N	BELLSOUTH CORP	59	49	53.875	-1.1	-2.0
Q	COMPRESSION LABS INC	16	7	13.25	-1.3	-8.6
Q	CONTEL CORP	37	23	31.875	-1.8	-5.2
Q	DATA SWITCH CORP	4	2	3.5	-0.3	-6.7
Q	DIGITAL COMM ASSOC	27	17	21	-1.5	-6.7
Q	DYNATECH CORP	21	15	18.25	0.1	0.7
Q	FIBRONICS INTNL INC	13	5	9.875	-0.9	-8.1
Q	GANDALF TECHNOLOGIES	7	2	3	0.0	0.0
N	GENERAL DATACOMM INDS	7	3	3.375	-0.3	-6.9
N	GTE CORP	36	27	27.5	-1.8	-6.0
Q	INFOTRON SYS CORP	11	3	3	-0.3	-7.7
N	ITT CORP	65	51	54.75	-3.3	-5.6
N	M A COM INC	8	3	4.75	-0.4	-7.3
Q	MCI COMMUNICATIONS CORP	49	31	34.875	-2.1	-5.7
N	NETWORK EQUIP TECH INC	34	6	6.5	-0.5	-7.1
Q	NETWORK SYS CORP	15	7	10.125	-0.8	-6.9
N	NORTHERN TELECOM LTD	30	20	26.25	-0.8	-2.8
Q	NOVELL INC	59	24	45.875	-3.1	-6.4
N	NYNEX CORP	92	73	75.375	-1.3	-1.6
N	PACIFIC TELESIS GROUP	52	40	41.25	-1.6	-3.8
A	PENRIL CORP	9	5	7.125	-0.5	-6.6
N	SCIENTIFIC ATLANTA INC	29	19	22	-3.6	-14.1
N	SOUTHWESTERN BELL CORP	65	51	52.75	-2.0	-3.7
Q	3 COM CORP	19	10	13.75	-2.1	-13.4
N	U S WEST INC	41	33	36.125	-1.4	-3.7

Computer Systems

EXCH		52-WEEK RANGE		CLOSE AUGUST 8, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLIANT COMPUTER SYS	9	3	3.875	-0.4	-8.8
Q	ALPHA MICROSYSTEMS	8	2	2.25	-0.2	-6.5
Q	ALTOS COMPUTER SYS	8	5	8.125	-0.1	-1.5
A	AMDAHL CORP	19	11	13.375	-1.9	-12.3
Q	APPLE COMPUTER INC	50	32	40.125	-2.3	-5.3
Q	AST RESH INC	26	7	20	-1.1	-5.3
N	BOLT BERANEK & NEWMAN	9	4	4.25	0.0	0.0
N	COMPAQ COMPUTER CORP	68	37	54.375	-0.4	-0.7
N	COMMODORE INTNL	12	6	6.375	-0.5	-7.3
N	CONTROL DATA CORP	22	13	13.875	-1.8	-11.2
N	CRAY RESH INC	51	31	38.5	-5.0	-11.5
N	DATA GEN CORP	17	6	6.125	-1.4	-18.3
N	DATAPOINT CORP	6	1	1.5	-0.1	-7.7
Q	DELL COMPUTER CORP	14	5	10.625	-1.4	-11.5
N	DIGITAL EQUIP CORP	103	67	69.25	-5.1	-6.9
N	FLOATING POINT SYS INC	4	0	2.25	-0.1	-5.3
N	HARRIS CORP	40	26	27	-3.4	-11.1
N	HEWLETT PACKARD CO	57	38	38.5	-3.9	-9.1
N	HONEYWELL INC	112	73	98.375	-3.4	-3.3
N	IBM	123	93	103.125	-8.5	-7.6
Q	INFORMATION INTL INC	16	12	12.125	-0.5	-4.0
Q	IPL SYS INC	14	5	10.25	-1.3	-10.9
N	MAI 8ASIC FOUR INC	6	2	1.875	-0.1	-6.3
N	MATSUSHITA ELEC INDL LTD	180	123	124.25	-12.3	-9.0
Q	MENTOR GRAPHICS CORP	26	14	15.25	-0.5	-3.2
N	N8I INC	2	0	0.25	0.0	-11.0
N	NCR CORP	72	55	65.25	-4.0	-5.8
Q	PYRAMID TECHNOLOGY	36	12	19.75	-3.3	-14.1
Q	SEQUENT COMP SYS INC	34	14	26.5	0.0	0.0
Q	SUN MICROSYSTEM INC	37	13	30.25	-1.3	-4.0
Q	SYM8OLICS INC	2	0	0.5	0.1	33.3
N	TANDEM COMPUTERS INC	30	17	17.625	-1.3	-6.6
N	TANDY CORP	49	30	33.5	-3.9	-10.4
N	ULTIMATE CORP	11	5	6.375	0.4	6.3
N	UNISYS CORP	23	9	10	-1.1	-10.1
A	WANG LA8S INC	7	3	3.75	-0.3	-6.3

Software & DP Services

EXCH		52-WEEK RANGE		CLOSE AUGUST 8, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
Q	AMERICAN MGMT SYS INC	20	11	14.75	-2.8	-15.7
Q	AMERICAN SOFTWARE INC	18	8	10.125	-4.0	-28.3
N	ANACOMP INC	7	2	2.625	-0.4	-12.5
Q	ANALYSTS INTL CORP	24	14	17.5	-2.0	-10.3
Q	ASHTON TATE	15	8	9	-1.4	-13.3
Q	ASK COMPUTER SYS INC	13	7	8.875	-0.8	-7.8
N	AUTO DATA PROCESSING	60	40	50.125	-2.6	-5.0
Q	AUTODESK INC	60	33	49	-4.3	-8.0
Q	BMC SOFTWARE INC	30	14	23.25	-2.3	-8.8
N	8USINESSLAND INC	14	2	3.75	-3.1	-45.5
Q	COGNOS INC	10	4	8.75	-0.9	-9.1
N	COMPUTER ASSOC INTL INC	20	7	7.625	-0.8	-9.0
Q	COMPUTER HORIZONS CORP	17	7	13.25	-2.8	-17.2
N	COMPUTER SCIENCES CORP	59	40	41.625	-1.5	-3.5
N	COMPUTER TASK GROUP INC	13	9	9.5	-1.0	-9.5
Q	COMSHARE INC	25	16	20.25	-0.8	-3.6
Q	CORPORATE SOFTWARE	16	8	13.25	-1.3	-8.6
N	GENERAL MTRS (CLS E)	38	24	30.625	-2.6	-7.9
Q	GOAL SYSTEMS INTL	18	10	13.75	-1.1	-7.6
Q	HOGAN SYS INC	7	2	3.5	0.3	7.7
Q	INFORMIX CORP	18	8	8.25	-2.1	-20.5
Q	INTELLICORP INC	8	4	4.25	-0.6	-12.8
Q	LEGENT CORP	32	19	21.25	-2.3	-9.6
Q	LOTUS DEV CORP	39	20	20.75	-2.3	-9.8
Q	MICROSOFT CORP	81	28	63.5	-3.3	-4.9
Q	NATIONAL DATA CORP	35	11	12.5	-0.4	-2.9
N	ON LINE SOFTWARE INTL INC	11	6	6.625	-0.4	-5.4
Q	ORACLE SYS CORP	188	15	16	-1.1	-6.6
N	PANSOPHIC SYS INC	19	10	11.25	-1.4	-10.9
Q	PHOENIX TECHNOLOGIES INC	6	2	2.875	-0.4	-11.5
N	POLICY MGMT SYS CORP	43	30	43.375	0.0	0.0
Q	PROGRAMMING & SYS INC	25	16	16.5	-1.8	-9.6
Q	RELATIONAL TECH INC	10	4	4.5	-0.4	-7.7
N	REYNOLDS & REYNOLDS CO	27	17	17.25	-2.4	-12.1
Q	SAGE SOFTWARE INC	16	7	11	-2.0	-15.4
Q	SEI CORP	22	15	19	-1.3	-6.2
Q	SHARED MED SYS CORP	17	12	13.125	-1.3	-8.7
Q	SOFTWARE PU8G CORP	28	14	23.5	-2.8	-10.5
N	STERLING SOFTWARE INC	11	7	8.625	-0.9	-9.2
Q	SUNGARD DATA SYS INC	26	17	21.25	-1.3	-5.6
N	SYSTEM CENTER INC	25	13	13.25	-2.4	-15.2
N	SYS. SOFT INC	29	16	22.375	-0.9	-3.8
Q	WORDSTAR	2	1	0.75	-0.2	-22.6

Semiconductors

EXCH		52-WEEK RANGE		CLOSE AUGUST 8, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
N	ADV MICRO DEVICES INC	11	5	5.625	-1.3	-18.2
N	ANALOG DEVICES INC	11	6	6.625	-0.3	-3.6
Q	ANALOGIC CORP	11	8	9.25	-0.1	-1.3
Q	CHIPS & TECHNOLOGIES INC	26	15	15.75	-0.5	-3.1
Q	INTEL CORP	52	28	37.125	-5.4	-12.6
Q	MICRON TECHNOLOGY INC	16	7	9.375	-1.8	-15.7
N	MOTOROLA INC	88	53	76	-4.4	-5.4
N	NATL SEMICONDUCTOR	9	5	5.375	-0.3	-4.4
N	TEXAS INSTRS INC	44	28	29	-2.6	-8.3
A	WESTERN DIGITAL CORP	15	6	9.875	-2.3	-18.6

Peripherals

EXCH		52-WEEK RANGE		CLOSE AUGUST 8, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
Q	ALLOY COMP	2	0	0.438	-0.2	-29.9
N	AM INTL INC	6	2	2	0.0	0.0
Q	AUTO TROL TECH CORP	5	2	2.75	-0.5	-15.4
Q	BANCTEC INC	24	13	18.25	-1.0	-5.2
A	COGNITRONICS CORP	8	3	5.375	-0.9	-14.0
Q	CONNER PERIPHERALS	31	11	23.5	-3.6	-13.4
A	DATARAM CORP	22	8	15.875	-3.1	-16.4
N	EASTMAN KODAK CO	52	36	41.125	-1.3	-2.9
N	E M C CORP MASS	7	3	5.5	-0.1	-2.2
Q	EMULEX CORP	9	4	6.5	-0.6	-8.8
Q	EVANS & SUTHERLAND	35	18	25.75	-0.5	-1.9
Q	ICOT CORP	2	1	1.313	-0.3	-16.0
Q	INTERLEAF INC	8	5	5.125	-1.3	-19.6
Q	IOMEGA CORP	6	3	4.625	-0.4	-7.5
Q	MASSTOR SYS CORP	4	1	1.125	-0.1	-5.3
Q	MAXTOR CORP	17	7	9.625	-1.1	-10.5
Q	MICROPOLIS CORP	10	3	7	-1.4	-16.4
N	MINNESOTA MNG & MFG CO	91	68	84	-7.0	-7.7
Q	PERSONAL COMP PRODUCTS INC	5	4	3.969	0.0	0.0
Q	PRINTRONIX INC	15	8	11.125	-0.3	-2.2
N	QMS INC	21	9	16	-1.5	-8.6
Q	QUANTUM CORP	26	9	18.75	-3.0	-13.8
N	RECOGNITION EQUIP INC	9	4	5	-0.3	-4.8
Q	REXON INC	10	5	6	-0.8	-11.1
Q	SEAGATE TECHNOLOGY	20	11	11	-1.6	-12.9
N	STORAGE TECH CORP	35	9	21.5	-4.4	-16.9
Q	TANDON CORP	4	1	2.313	-0.3	-9.8
N	TEKTRONIX INC	23	12	14	-2.0	-12.5
Q	TELEVIDEO SYS INC	1	0	0.344	0.0	0.0
N	XEROX CORP	69	43	44.625	-2.4	-5.1

Leasing Companies

EXCH		52-WEEK RANGE		CLOSE AUGUST 8, 1990	WEEK NET CHNGE	WEEK PCT CHNGE
N	CAPITAL ASSOC INTNL INC	7	2	1.75	-0.4	-17.6
N	COMDISCO INC	34	17	18	-1.4	-7.1
Q	LDI CORPORATION	18	13	13	-1.5	-10.3
Q	PHOENIX AMERN INC	5	3	3	-0.6	-17.2
Q	SELECTERM INC	9	3	3.25	-1.3	-27.8

EXCH: N=NEW YORK; A=AMERICAN; Q=NATIONAL

Fitness test

Wall St. gymnastics left some firms high, others exhausted

Up, down. Up, down. Last week's calisthenics were tough on technology stocks as investors exercised the right to change their minds — first slamming prices down, then pumping them back up again by Thursday's close. Novell, Inc. lost a chunk but then finished strong, jumping 3½ points by Thursday to 48¼. Microsoft Corp. managed to overcome a price slip, eventually gaining 1⅞ points to reach 65⅛.

Other companies could not hack the rigorous workout and lost big for the week. Hewlett-Packard Co. hit a new low on Monday — along with several other stocks — and then continued the downturn, sliding 3½ points to close the week at 37. Computer Associates International, Inc. sagged to 7⅝, down ⅛ of a point. Lotus Development Corp. announced staff cutbacks and then dropped to a new low. At week's end, its shares were down ¾ of a point to 21¼.

The bigger they were, the harder they fell. IBM dropped 4⅞ points for the week to 103¼, and Digital Equipment Corp. sank 3¼ points to 68⅝. Texas Instruments, Inc. stumbled 2 points to 28¾.

Several firms, although battered by traders' whims, ended up right back where they started. Among those unchanged for the week were Intel Corp. at 39¼, National Semiconductor, Inc. at 5⅜, Compaq Computer Corp. at 54½ and NEC Technologies, Inc. at 57.

Telecommunications issues mixed it up, with MCI Communications Corp. declining ¼ of a point to 35½ and AT&T losing ⅞ of a point to hit 35⅛. United Telecom, Inc., however, inched up ⅝ of a point to 25⅜.

KIM S. NASH

Saudi

FROM PAGE 1

Sysorex International, Inc. has 15 U.S. employees — some of whom have families with them — located in Riyadh to develop a computer system for the Saudi Arabian Department of Customs. Peter Gioe, director of administration and personnel at the firm's Mountain View, Calif., headquarters, said, "They're somewhat anxious, as you might expect. But they are reassured that as soon as the situation warrants, they are in a position to leave."

AT&T has several hundred American employees in Saudi Arabia who are staying for the moment, a spokesman said. However, the company also has "a couple of dozen" employees in Kuwait working on a telecommunications modernization project, and the spokesman said AT&T is working with the State Department to get them out. AT&T has learned through intermediaries that the employees are safe, he said.

"The people on or near the border are very concerned, of course, but many Americans in Saudi Arabia do not seem unduly concerned," Leslie said.

Business in Saudi Arabia is far from slow. It is the largest consumer nation on the Persian Gulf, according to trade figures for the Computer and Business Equipment Manufacturers Association (CBEMA).

Year-to-date figures through May 1990 show sales from the Middle East at $161.5 million, with $24.6 million coming from Saudi Arabia and $12.2 million from Kuwait. Saudi Arabia is also the second-largest Middle Eastern market for telecommunications equipment, according to CBEMA.

However, while the deployment of U.S. troops to Saudi Arabia may insulate that nation from invasion or enable it to repel an assault, the Iraqi effort to annex Kuwait has halted business there. Businesses formerly based in Kuwait are looking for a new place to set up shop, and computer vendors in the U.S. that sell equipment through distributors have been forced to move on.

"We have lost some business there, but we didn't put all our eggs in one basket. We'll just have to move on," said Michael Burke, director of sales for the Middle East at Sprint International.

"We're not going [to the Middle East] again. We won't do business over there," said Ross Perot, chairman of Perot Systems Corp. In 1979, Perot executed a daring rescue in which he freed two U.S. employees of Electronic Data Systems Corp., which he headed, from an Iranian prison.

Perot said his advice to U.S. companies with Middle East operations is to pull their people out as soon as possible. "If you have a problem over there or anywhere in the world, you'll get no help from anyone in the U.S. government," he said.

Few computer companies do direct business in the Middle East, preferring to work through local third-party distributors.

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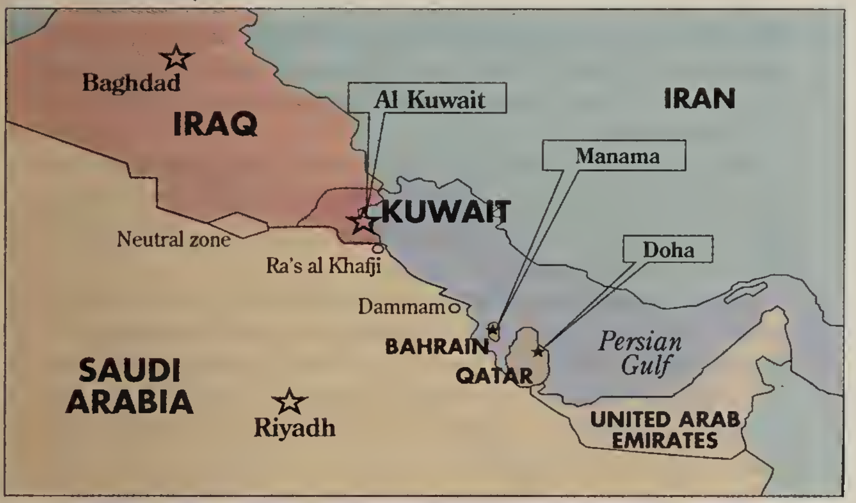
>
> ROSS PEROT
> PEROT SYSTEMS CORP.

Until recently, Kuwait was the headquarters for many of those distributors. The country was favored for setting up headquarters, because entering and leaving Kuwait was relatively easy, said Burke, who oversees the Sprint business conducted through distributors.

National Correspondent Mitch Betts contributed to this report.

Mounting tension

With growing turmoil after Iraq's recent actions, computer merchants faced a move en masse from invaded Kuwait into Saudi Arabia



CW Chart: Paul Mock

Oil trackers quicken pace

BY MITCH BETTS
CW STAFF

The Middle East crisis has meant very hectic times at Computer Petroleum Corp., a St. Paul, Minn.-based firm with an electronic database that tracks wholesale and retail petroleum prices. "We're running full out," said Gary Thomas, director of operations.

The company, which surveys the oil industry to create its pricing database, allows subscribers to dial into an NCR Corp. 9800 mainframe computer and download the price surveys.

Thomas said the number of subscriber log-ons has increased 30% to 35% since the crisis began. The number of data transfers is up 28%, he said.

One customer, the American Automobile Association (AAA), relies on the company for the "AAA Fuel Gauge Report," which was used by the news media and concerned politicians to track the daily price hikes at local gasoline stations. For example, it showed that self-serve, regular unleaded gasoline cost an average of $1.237 per gallon on Aug. 8, which was 16.2 cents higher than the price just before Iraq's invasion of Kuwait.

Most subscribers are companies in the petroleum industry that use the database in the morning to guide them in making pricing decisions for the day, Thomas said.

Kuwaiti businessman flees turmoil

BY MAURA J. HARRINGTON
CW STAFF

Two weeks ago, Abdulmohsen Al-Babtain was a busy man as president of Gulfnet Kuwait, an international distribution company with headquarters in Kuwait. Today, after fleeing Kuwait, which was invaded by Iraq on Aug. 2, Al-Babtain is happy just to be alive.

"It all happened early in the morning. We woke up to the sound of artillery and machine guns at four or five in the morning," explained Al-Babtain, a Kuwaiti national who managed to escape his homeland by car shortly before Iraqi President Saddam Hussein ordered all Kuwaiti borders to be tightly sealed.

"At first people didn't take [the invasion] seriously because [Kuwait] had helped Iraq for all those years," Al-Babtain said, referring to reports that Kuwait had given millions of dollars in aid to Iraq after the war between Iran and Iraq.

"It was the shock effect at first. People just went to work around everything. But then it got serious. If you went on the roof you could see the heavy bombing and the tanks," Al-Babtain said.

"I lost track of time, but on the fourth day we escaped by car . . . I took my grandmother, and my family — my wife and kids — was already in London, but my brothers and sisters, they are still in Kuwait," Al-Babtain continued.

> "I HAVE HEARD the Iraqis have stopped everything. Our business there is lost."
>
> ABDULMOHSEN
> AL-BABTAIN
> GULFNET KUWAIT

Al-Babtain, whose company distributes Sprint International's telecommunications products in the Middle East, said he had managed to contact his family by cellular radio from the town of Khafji on the Kuwait-Saudi border. He made the contact shortly before the Iraqi army overtook the town, he said.

Al-Babtain said all business in Kuwait has been halted.

"I have heard the Iraqis have stopped everything. Our business there is lost," he said.

Persian Gulf customers

Kuwait was one of many Persian Gulf countries purchasing computer equipment from Al-Babtain's and other distribution companies in the Middle East.

According to Al-Babtain and other distributors, computers are infiltrated throughout all levels of business in Persian Gulf countries, including Kuwait, the United Arab Emirates, Oman, People's Democratic Republic of Yemen, Saudi Arabia, Iraq, Jordan and Bahrain.

"We have global support to go ahead with our [business] plans in other [Persian Gulf] countries, and we will do that. We were involved in this business in Kuwait since 1977. That's gone, unfortunately, and will take a long time to build back up," Al-Babtain said. "But for the long term, we will continue to establish joint ventures, continue with research and development and build up a maintenance company for the whole Persian Gulf."

DEC opts for Objectivity's object-oriented database

BY JEAN S. BOZMAN
CW STAFF

MENLO PARK, Calif. — After studying a cluster of object-oriented database companies on both the East and West Coasts, Digital Equipment Corp. picked Objectivity, Inc., a 2½-year-old firm, to give DEC users their first window on the technology.

The relationship between DEC and the 30-person start-up firm, which began selling its product in April, is still being defined. It is not an exclusive relationship, since Objectivity is also being ported to Sun Microsystems, Inc., Hewlett-Packard Co. and Sony Microsystems, Inc. platforms.

"We run today on Sun-3s and Sun-4s," Objectivity President Bob Field said. "We're also porting it to 386-based PCs, Decstation 3100s, Vaxstations and Sony workstations."

Vital to Objectivity's architecture is an ability to "translate" the data automatically. "We store the data in the format in which it was last used," Field explained. "If you store the data on a Sun-4 and the Decstation wants to read it, the database software translates it and deals with the bit-ordering and floating-point information."

DEC engineers are working on an interface between Objectivity/DB and DEC's own RDB relational database, said Lydia Bennett, product manager for object-based systems at DEC. However, final DEC product and pricing information is several months away.

The joint development and marketing partnership is a first for the industry, said Les Hellenack, director of new software technologies at International Data Corp. in Framingham, Mass. "Objectivity pulled a coup by being the first object-oriented database selected to become part of a systems vendor's product line," he said.

NEWS SHORTS

Soderblom token-ring claim tossed

Last week, the U.S. Patent Office disallowed Olof Soderblom's most recent attempt to maintain his patent claim on the technological basis of the IEEE 802.5 token-ring standard. The office had already ruled that Soderblom's original 1968 patent did not apply to the specific closed-loop token-ring technology used in 802.5. Soderblom then entered 34 arguments against this decision, but the patent office disallowed those points that directly related to his 802.5 claims.

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Microsoft prepares OS/2 gap filler

Microsoft Corp. will ship a modified version of OS/2 Release 1.2 to OEMs next month, with more than 30 hardware vendors, including IBM, slated to receive it. Microsoft plans to release it within the next 90 days. In addition to supporting OS/2 LAN Manager 2.0, which Microsoft said will ship next week, the upgraded OS/2 Release 1.21 will provide users with "significant" advances in printer functionality, according to Pat Bellamah, Microsoft's OS/2 product manager.

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Autodesk pirates paying up

Autodesk, Inc. said last week that its antipiracy campaign is starting to pay off. More than $2 million has been collected in 18 months from software users who have been nabbed making illegal copies of Autodesk software, the company said.

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IBM mixes, matches net groups

IBM has quietly initiated the separate consolidations of its local-area network and network management groups as part of a strategy to focus and expand these strategic areas, a company spokeswoman said last week. Network management products at IBM were formerly divided into products, systems management and alliances groups, whose directors reported to IBM's director of communications programming, Van Hettinger. The reorganization puts all of these groups under William Warner, former director of the Application System/400 programming laboratory in Rochester, Minn. LAN products, which were formerly scattered among such IBM groups as the Entry Systems Division, are now under Donald Haile, former director of IBM's software systems for enterprise systems.

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Korea phone network goes digital

South Korea is planning to install 2.68 million telephone lines nationwide next year, some 62% of which will employ the country's own TDX digital switching system, according to a Korea Telecommunications Authority (KTA) announcement. When the installation is completed by the end of next year, KTA said there will be 36 telephone lines for every 100 inhabitants. KTA said it will stop supplying its conventional analog exchange system next year.

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AT&T snags more Sabre business

AT&T has won a multimillion-dollar overseas slice of the Sabre pie for the next five years. Networked AT&T 6386/SX and 6386/25 Workgroup Systems will be the hardware of choice for the Sabre Travel Information Network's agencies and administrative offices in Europe, Canada, the Caribbean and the Pacific Rim, the companies said. Sabre's Travel Information Network is the marketing arm of the Sabre computerized reservation system. AT&T last year was awarded Sabre's U.S. domestic computer contract, valued at $100 million.

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China to focus on smaller systems

China will suspend mainframe development projects and concentrate its domestic computer efforts on producing open system minicomputers and superminis, according to a government official. China is also seeking cooperative agreements with foreign workstation vendors. The official said China can now manufacture workstations based on Hewlett-Packard Co.'s Precision Architecture.

Graphics workstation market upbeat

BY ELLIS BOOKER
CW STAFF

DALLAS — Whether or not the graphics capabilities shown at Siggraph are destined for the average television — let alone the average computer — the market for technical workstations able to manipulate high-resolution, three-dimensional graphics and images will keep workstation vendors humming.

To that end, Sun Microsystems, Inc. in Mountain View, Calif., unveiled two high-end "visualization" workstations in Dallas last week.

The two models of the Sparcstation VX — priced at $55,900 and $86,900, respectively — make use of Intel Corp.'s 64-bit I860, a chip that has become a darling among workstation vendors for use in their graphics subsystems since its introduction by Intel last February.

Sun also introduced a multiprocessor MVX board option for the new VX workstation that can boost its 40 million instructions per second (MIPS) and 60 million floating-point operations per second (MFLOPS) peak performance to 160 MIPS and 240 peak MFLOPS.

The new hardware will use Sunvision, a $3,000 software package for image processing and photo-realistic rendering on the Sparcstation, and XGL, a two-dimensional and 3-D graphics software library, both of which Sun introduced in March.

Some other announcements made by the 245 Siggraph exhibitors included the following:

- Texas Instruments, Inc. said it has developed a working prototype of a laser-based display system that presents real 3-D images that can be seen from any angle with a 750- by 750-pixel resolution. TI said it was seeking parties interested in developing applications for its Omniview display system.
- Digital Equipment Corp. introduced DEC AVS, a data visualization software tool for its Decstation family of Unix workstations. It is DEC's implementation of Stardent Computer, Inc.'s Application Visualization System software under a licensing agreement. DEC also said it would work with Rasterops Corp. on full-motion television and video for its workstations and with Brooktree Corp. on true-color windowing systems.
- Edsun Laboratories, Inc. in Waltham, Mass., showed a pin-compatible replacement chip for the display subsystems of IBM Video Graphics Array (VGA)-compatible boards that enables them to show photo-realistic still images on ordinary monitors. The very large-scale integration chip, which replaces the standard random-access memory/digital-to-analog converter on a VGA board, mixes two colors per pixel, allowing the standard personal computer to move up from 256 colors to 790,000 colors. The chip also helps smooth the rough edges — or "jagging" associated with VGA displays.

The chip, which is being codeveloped and manufactured by Norwood, Mass.-based Analog Devices, Inc., will be in production in September, and display drivers have already been developed for a few popular PC applications, according to Edsun officials, who said a driver for Microsoft Corp.'s Windows Version 3.0 is scheduled to ship in November.

REPORTER'S NOTEBOOK

Siggraph when it sizzles

DALLAS — A gigantic metal cockroach ominously prowls the streets of a full-color, photo-realistic world. Aside from being very un-Disneylike, this cartoon is special because it was created on a computer.

Welcome to Siggraph '90. The computer industry graphics show last week delivered, as expected, its usual dose of breathtaking 3-D computer simulations, much to the delight of the 25,000 attendees in Dallas.

From "visualization," in which huge amounts of complex scientific data are portrayed graphically, to "virtual reality," in which the user dons a helmet and gloves to enter and interact with computer-generated worlds, graphics technology has placed an array of tantalizing tools in the hands of software and applications developers.

What these superb animations will mean for traditional business computing is harder to see, but even here trends are coming into focus. Take, for example, a graphical representation of air pollution data, shown at one of the 28 day-long seminars at the conference. In the demo, a topological map of Los Angeles was superimposed over a satellite photograph; over this contoured surface, colored globes representing tons of pollution and arrows representing air flow colorfully danced — a vivid, shocking portrayal of the sorry state of LA's smog problem.

Hypermedia is a young science, Walter Bender, principal research scientist at MIT's Media Lab, said earlier in the day. "Books and writing have had centuries to evolve . . . hypermedia has only had a decade," he said.

High-definition television is not the issue, Bender continued. He said consumers simply are not complaining about the image quality of their TV sets.

"The complaints are over content," Bender said, adding that computers, software and direct distribution of programming can and will make TV sets and the information they carry more adaptable to the needs of the viewer.

ELLIS BOOKER

Low-cost Sparc systems to integrate DOS

BY J. A. SAVAGE
CW STAFF

Promising availability in the next few months, Taiwan-based Tatung Co. has a product that integrates personal computers based on DOS and complex instruction set computing as well as workstations based on Unix and reduced instruction set computing.

Tatung, a high-volume PC clone maker, licensed Sun Microsystems, Inc.'s Scalable Processor Architecture (Sparc) in June 1989. It is the first foreign company to import Sparc-based workstations. Several other foreign corporations have licensed Sparc but have yet to market workstations. Japan-based Toshiba Corp. imports laptops based on Sparc.

Tatung will use a U.S. corporation — Mars Microsystems in Mars, Pa. — as the distributor.

The basic workstation, called Mariner 4I, will be based on Sparc, with a base price of $5,995 — about $1,000 more than a Sun diskless workstation. A DOS add-on, which uses an Intel. Corp. 80386 processor that fits on the Sparc motherboard, will be optional, according to a spokeswoman.

Tatung is the first of an expected flood of Sparc-based foreign clones. "Sun will have to live with the results," said Bruce Jenkins, an analyst at Daratech, Inc., a Cambridge, Mass.-based market research firm. "On the positive side, Sparc as a standard is promulgated far and wide. On the negative side, it intrudes on the company's market share."

AS/400 may break free of SNA

BY ELISABETH HORWITT
CW STAFF

NEW YORK — IBM is expected to further extend the Application System/400's ability to communicate outside the Systems Network Architecture environment next week.

Announcement of the extensions, which will probably share the limelight with news of IBM's low-end additions to the AS/400 family [CW, Aug. 6] will encompass major local-area network protocols such as Ethernet and Transmission Control Protocol/Internet Protocol (TCP/IP), as well as the Integrated Services Digital Network (ISDN) telecommunications standard.

Features expected for the AS/400 include the following:

- Support of 802.3 Ethernet on the AS/400's internal adapter. This will provide less costly and more efficient Ethernet connections than the current support, which requires an outside box.
- An adapter with a total throughput of 16M bit/sec., which would connect up to four Token-Rings to the AS/400. The current Token-Ring adapter for the AS/400 supports only 4M bit/sec. speeds.
- Faxsupport 400, a software product that would turn an AS/400 into a facsimile server for personal computers using IBM's PC Support program.
- Support of Telnet, the terminal-to-host application for TCP/IP.
- Software to provide links between the AS/400 and IBM's RISC System/6000.

Both the faster Token-Ring connection and the fax server software could find a home at Kendall Co., according to Steve McManama, director of computing services at the Boston-based health care company.

AS/400 link

Kendall is in the process of linking its extensive AS/400 installation over Token-Rings running on unshielded twisted pair wire and is looking for a way to boost transmission, McManama said. Kendall is also working with Electronic Data Systems Corp. to attach a fax machine to the AS/400. He would welcome software to allow PCs to send faxes through the host, he added.

Kendall is less interested in TCP/IP than in Open Systems Interconnect (OSI) as a way to link its AS/400s to a Digital Equipment Corp. VAX 8500, McManama said. IBM has made a statement of direction that it will implement OSI on the OS/400 operating system but is unlikely to announce such a product next week, sources said.

Several expected introductions will expand the AS/400's ability to act as the focal point for meshing voice and data networking applications over ISDN.

Teleos Communications, Inc. has developed an ISDN board for IBM that allows the AS/400 to communicate over a 1.5M bit/sec. ISDN Primary Rate Interface, a Teleos spokeswoman said. In addition, Teleos is expected to introduce an ISDN server platform that will coordinate communications between the host and lower speed ISDN lines out to individual devices, either locally or remotely.

The server is also expected to play a part in IBM's expected announcement of ISDN-based links for Callpath 400, its host-to-private branch exchange interface for the AS/400.

IBM would not comment on whether the above networking announcements were in the works.

A key networking product that probably will not be ready in time for next week's introduction is a programmable protocol converter that will allow users to link virtually any type of proprietary device to the AS/400, according to David Andrews, president of the Cheshire, Conn. consulting company ADM, Inc.

A prototype of the product, which IBM has demonstrated to some of its business partners, incorporates a Personal System/2 motherboard and "selected PS/2 chips and components in a small physical package," according to Andrews.

Communications feast

IBM's AS/400 connectivity announcements will act as an appetizer to a much larger banquet of communications-related introductions slated for early next month, several sources said.

An expected new version of IBM's Netview network management system will include at least two long-awaited enhancements: an internally developed graphics-based user interface and support of IBM's peer-to-peer LU6.2 protocol, according to Richard Boyle, a program director at Stamford, Conn., research firm Gartner Group, Inc.

Based on IBM's Presentation Manager, the graphics-based interface will supersede the Netcenter Netview workstation, which IBM purchased from US West approximately one year ago. However, the initial release will only contain pieces of the final IBM product, one source said.

Native support of LU6.2 on Netview will open the way at last for effective two-way communications between network management hosts and non-IBM networking systems, according to Joseph Mohen, president of Seacliff, N.Y., consulting company Teleprocessing Connection.

Currently, non-IBM devices must access Netview hosts via Netview/PC, a PC-based interface that has been roundly criticized by vendors as being awkward and limited. LU6.2 will also provide more effective communication between multiple Netview hosts and between Netview and other vendors' systems that control different network domains, Mohen said.

Also in September, IBM will release a list of approximately 40 LAN and LAN-diagnostic vendors that "are lining up behind IBM for integrated network management," Boyle said. "Not too many major companies will be missing."

ELISABETH HORWITT

Unix

FROM PAGE 1

Brothers is currently using a large number of Unix-based Sun and Pyramid Technology Corp. workstations.

While Unix celebrated its 20th anniversary last year, the operating system has only been available commercially since 1983 — coincidentally, at the height of the glory years for the Massachusetts mini makers. Those companies did not start to invest serious time and substantial money into multiplatform interoperability until the middle to latter part of the decade, well after the Unix movement had begun to gather steam.

DG was one of the earliest on the Unix bandwagon. It is currently betting the future on its reduced instruction set computing-based Aviion series, introduced in February 1989, and the company has reportedly signed more than 200 Aviion resellers to date.

"I think they are pivoting successfully from old to new world computing with their Aviion line," Colony said, "but they have to make money to keep customers, and the Aviion hasn't made enough to keep them in business." The company is currently depending on its proprietary MV line as its primary source of revenue.

Building new with old

DG has also been able to leverage its installed MV base to increase Aviion sales — at least in part. According to Rob Morrow, an Aviion user and planning manager at Boise Cascade in DeRidder, La., his company's decision to purchase the Aviion systems was based on the fact that all existing software applications were built on DG's AOS/ VSII platform, so "it just made sense to go with the Aviions — it allowed us to go with the same structure and framework."

George Weiss, an analyst at Gartner Group, Inc. in Stamford, Conn., said he feels that DG's Distributed Application Architecture is the most comprehensive of the second-tier companies' next-generation road maps but cautioned that the vendor must rapidly establish itself as a strong presence in vertical markets.

Wang, with revenue dropping 10% each year and no clear technology direction, might be in for a somewhat rougher ride. The company seems more preoccupied with finding the next dollar to keep it afloat than with pursuing new product development, Colony said.

However, users are keeping a stiff upper lip. Clem Kichuck, president of Market Corp. Systems in Westport, Conn., has been using Wang equipment for 10 years and is enthusiastic about Wang's progress in the Unix arena. Although a Unix version of Pace, Wang's database system, is not due out for another 12 months, Kichuck remained undaunted.

"Pace is, in my estimation, the finest database in the world," Kichuck said. "The only problem has been that it was a strictly proprietary system."

Larger niche market?

According to Weiss, Wang needs a larger niche market. "Their Unix ports for Pace systems are starting out late, and they have no high-end Unix strategy to speak of," he said. Weiss added that he is more optimistic regarding Prime's situation, where he sees Prime as being in a reasonably good position to move its 50 series users to EXL, Prime's Unix port. Prime will also be porting its Information database to Unix later this month.

The five-year forecast for the former minicomputer kings does not look all that bad. Analysts favored DG as a survivor, providing the company can continue to trim fat and learn to operate in the low-margin marketplace.

Industry experts generally predicted that Wang is likely to fall under new ownership within the next 12 to 18 months. They also speculated that Prime would evolve into two separate companies — Computervision playing the computer-aided design and manufacturing market and the other half devoted to departmental systems.

"It's easy to criticize in hindsight," Kernochan said. "These companies just couldn't react fast enough to the shifts in the marketplace. In the next couple of years, we're going to see cost cutting and more cost cutting, and over the long term, if they can succeed in the Unix world, they have a good chance for survival."

THE FIVE-YEAR forecast for the former minicomputer kings does not look all that bad.

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TRENDS

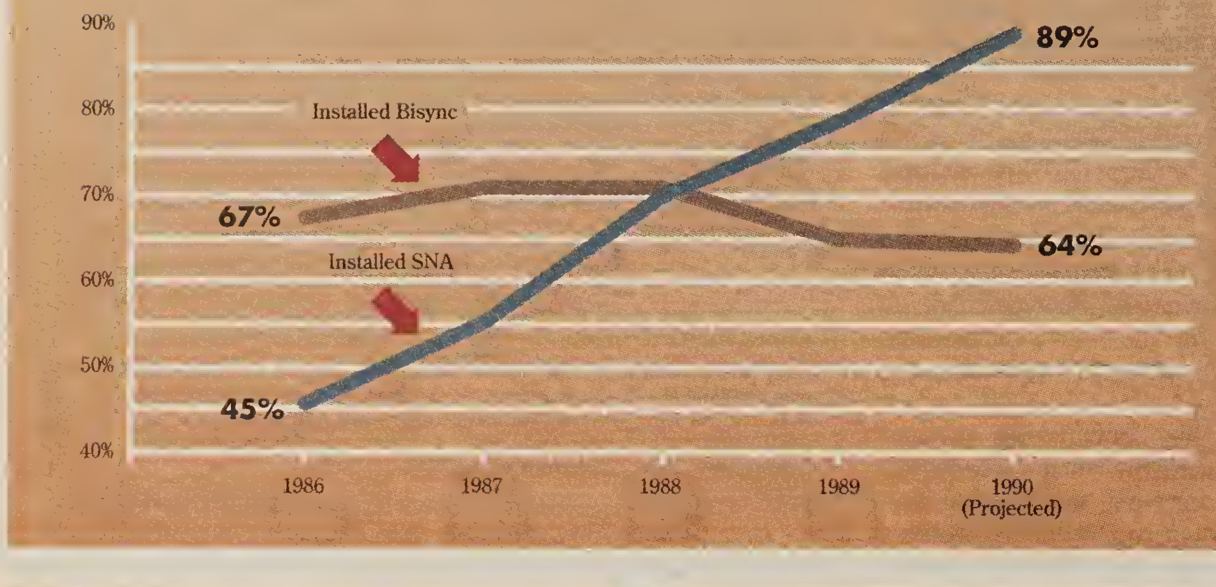
SNA

IBM's major hurdle was to get sites using older bisynchronous protocols to make the SNA upgrade investment. It's been well over a decade, but SNA is now right where IBM wants it to be — on top

Installed line protocols

SNA is currently used as a communications protocol at almost 90% of IBM sites. The older Bisync protocol began to drop off in 1987

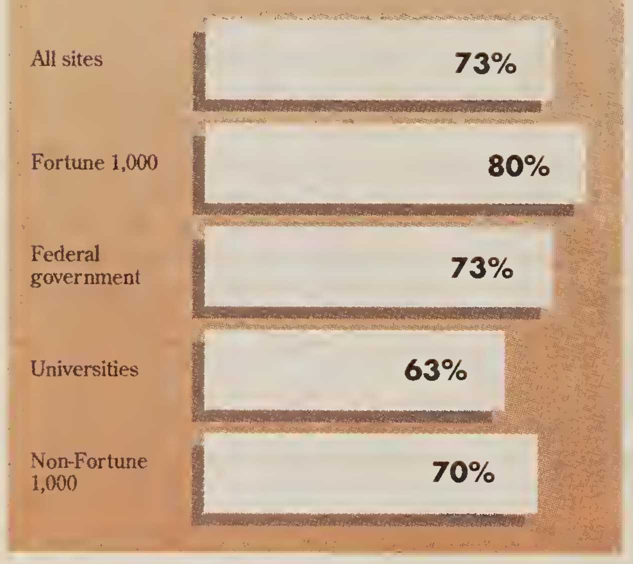
Percent of U.S. IBM communicating sites (Total: 9,350)



VTAM installations

VTAM, which runs an SNA network from an IBM mainframe, is installed at 73% of all IBM/plug-compatible mainframe sites

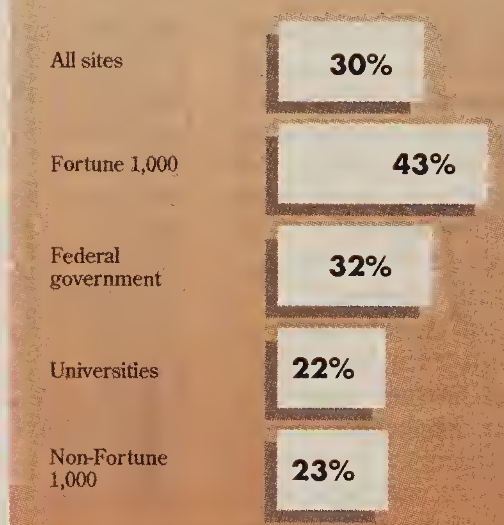
Percent of sites (Total: 11,000)



Network management software

Either IBM's Netview or Systems Center's Netmaster is currently installed at 30% of the total SNA sites

Percent of sites running VTAM (Total: 8,030)



Source: Computer Intelligence, La Jolla, Calif.

CW Chart: Tom Monahan

NEXT WEEK

Manager's Journal follows this week's special supplement on information systems in Japan with a profile on **Haruo Nabeshima,** general manager of IS at construction giant Taisei Corp. Like many Japanese IS managers, Nabeshima has spent his career rotating through several functions at Taisei and has worked in IS for only three years.

Kaku Kurita/Gamma Liaison

The triumph of perestroika is closely tied to computing, but Soviet computing ambitions currently far outweigh its abilities. New technology brings with it some weighty questions about such issues as information planning, as well as security and societal impact. Get a firsthand computing tour of the Soviet Union in In Depth.

INSIDE LINES

Painting the town

Next, Inc. is reportedly preparing for the debut of its color monitor system on Sept. 18 in San Francisco. The new offering will provide photo-realistic color and a graphics accelerator. Meanwhile, Businessland is hoping to clear some of the older monochrome models off the shelves in anticipation of the upcoming announcement and has chopped the list price of the systems 20% to $8,000.

LAN Man plan elan

Mike Murray at Microsoft confirmed that the long-awaited LAN Manager 2.0 is shrink-wrapped, in the box and will be on its way to distributors this week. "The product is obviously a little later than we had thought," he noted. Final code was shipped to OEMs several weeks ago. "They are all working with it," he said, noting that different OEMs add different levels of value to the product.

Headed for Vancouver?

Bill Gates, Microsoft's grand pooh-bah, recently bought a Porsche 959 and had it shipped to the States. Of course, he can't legally drive the much sought-after symbol of status and speed here, because it's too fast for U.S. roads and its emissions don't pass this nation's muster.

Relief from number-crunching

Why should PC users have all the fun? Tiger Media, a publisher of computer games on CD-ROM, is planning to release a role-playing game for Sun 's Sparcstations and compatibles. "Airwave Adventure: The Case of the Cautious Condor" will retail for $75 and will soon be available directly from the firm.

With friends like these...

The success of Intel's I860 graphics chip was apparent at the Siggraph '90 show in Dallas last week, turning up in boxes from about 20 vendors — including HP, Alliant, DEC and Sun. But Intel wants a piece of this game, too. The chip maker was demonstrating its own workstation using the chip in its booth. According to knowledgeable sources, a 40-MHz version of the I860 Image Workstation, marketed as a software development platform, will be available later this year.

Recalculating the spreadsheet

A source close to Lotus claims that some "really scared" Lotus employees are anticipating another wave of layoffs. "Managers' bonuses this year will depend in part on how well they cut costs," the source added. Lotus spokesman Richard Eckel declined to confirm or deny that report. However, he did concede that recent steps toward decentralization will mean "greater accountability, as well as greater flexibility, for those people managing decentralized business units."

Hall of fame?

Last week, when we received a collect call from Craig Neidorf, co-editor of "Phrack," a newsletter for hackers, we were certain that the 20-year-old college student was about to drop a major scoop into our laps. Neidorf was recently cleared of charges stemming from a plot to steal a text file detailing the workings of Bellsouth's emergency 911 telephone system. Neidorf and his attorney are planning to file a civil lawsuit against Bellsouth as a result of the case. Naturally, we though he was going to fill us in on the latest in this hack-fights-back story. But no, Neidorf wanted clips for his scrapbook — and oh, he wanted the originals, the one with the color photos and not copies, please.

Limpest promotional trick of the year: Nice try by Tandem media planners who invited the press to a no-news confab aboard a cruise through New York harbor next month. But the press hounds who pulled the napkin out of the champagne glass delivered at the close of deadline last week aren't likely to be in such a friendly mood after seeing a shower of gold confetti sprinkle their rugs. Surely Tandem has better things to do with its money. Direct your suggestions to News Editor Pete Bartolik at (800) 343-6474, fax them to (508) 875-8931 or address them to COMPUTERWORLD *via MCI Mail.*

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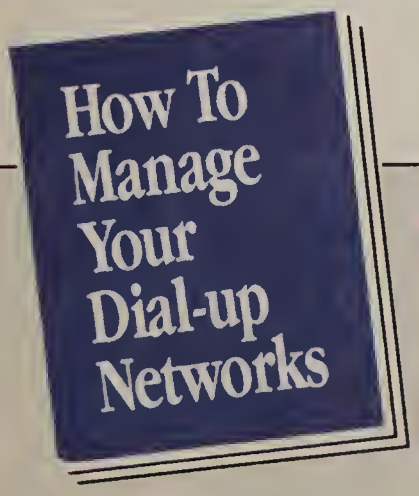

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NEWS RELEASE

INTEGRAL ANNOUNCES TRADE-IN PROGRAM FOR MSA AND M&D CLIENTS

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Walnut Creek, CA — In response to overwhelming requests from within the newly combined MSA and M&D client base, Integral today announced a financial and human resource software trade-in program designed to provide organizations with proven, stable and enduring business solutions.

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The program originated in response to strong and rapidly growing concern among the D&B Software client base over questions of product continuation, commitment to support, and overall D&B Software company strategy and technology direction. In recent coverage of the D&B Software user conference, COMPUTERWORLD noted that "many left the conference skeptical and confused about how the company will 'bridge' the redundant applications software lines it has acquired."

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